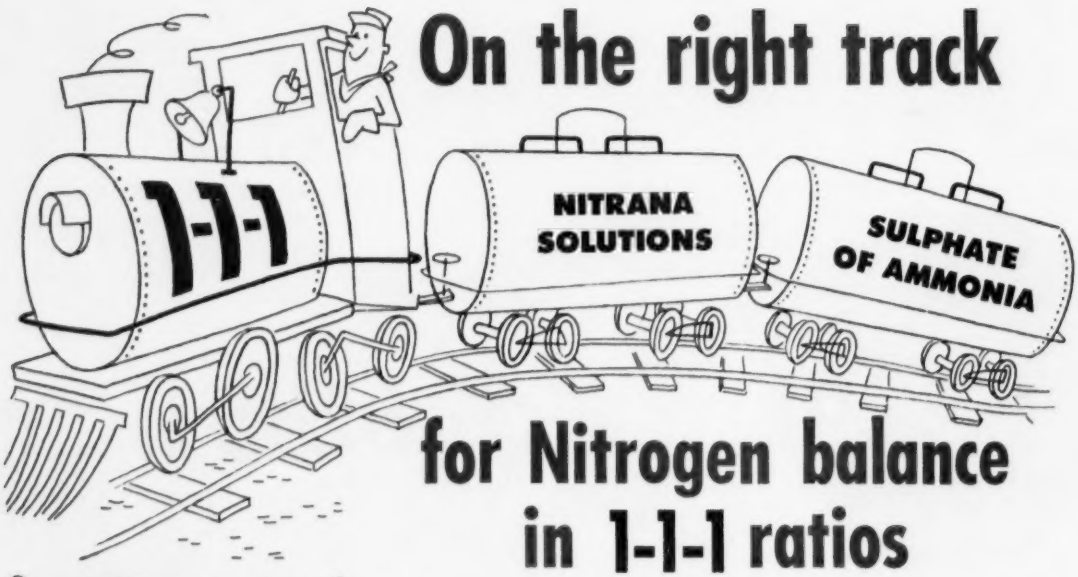
JUNE, 1955

Commercial Fertilizer

and PLANT FOOD INDUSTRY



On the right track for Nitrogen balance in 1-1-1 ratios

Arcadian®

PRODUCTS FOR PROFITABLE FARMING

Nitrogen Solutions (NITRANA® and URANA®)
Sulphate of Ammonia
AMERICAN Nitrate of Soda
A-N-L® Nitrogen Fertilizer
Urea Products

High-analysis 1-1-1 ratio fertilizers are in fast-growing demand by farmers. The increasing call for 8-8-8, 10-10-10 and 12-12-12 emphasizes the need for a practical means of building nitrate and ammonia nitrogen balance in these popular grades.

ARCADIAN® Nitrogen Solutions and Sulphate of Ammonia turn the trick. This economical combination is all you need to produce 1-1-1 and other ratio mixtures which cure quickly, with better granulation, less dust and better handling qualities. For details on this practical way to better fertilizers for your trade, consult a Nitrogen Division technical service representative. His services are available to customers at no cost.

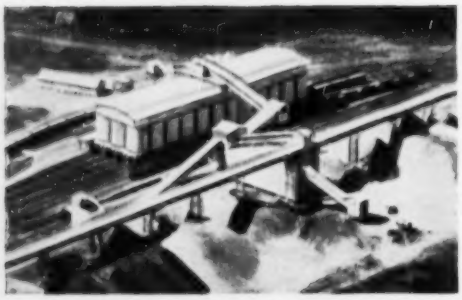
NITROGEN DIVISION, Allied Chemical & Dye Corporation
New York 6, N. Y. • Ironton, Ohio • Omaha 7, Neb.
Indianapolis 20, Ind. • Hopewell, Va. • Columbia 1, S. C.
Atlanta 3, Ga. • San Francisco 3, Cal. • Los Angeles 15, Cal.

NITROGEN DIVISION ALLIED CHEMICAL

Three of the A.A.C. Co's electrically-operated draglines at work at our phosphate mines in Central Florida. Bucket capacities range from 9½ to 17 cubic yards. The 17-yard draglines with their 175-foot booms each weigh more than a million and a half pounds and can move 35,000 tons of material in 24 hours. From these rock deposits flow a continuous stream of high quality phosphate rock, assuring a dependable source of supply of AA QUALITY phosphorus products, see list below.

AA Quality...

for over 85 years a symbol of quality and reliability



From the air—wet rock storage and drying plant, with dry rock storage silos in background. These silos, 29 in number, have a total capacity of 40,000 tons of dried rock. Under the silos are four runways where 40 railroad cars can be loaded at a time.

principal AA QUALITY products

All grades of Florida Pebble Phosphate Rock
AA QUALITY Ground Phosphate Rock
All grades of Complete Fertilizers **Superphosphate**
Gelatin **Bone Products** **Salt Cake** **Ammonium Carbonate**
Sulphuric Acid **Fluosilicates** **Insecticides and Fungicides**
Phosphoric Acid and Phosphates
Phosphorus and Compounds of Phosphorus

THE AMERICAN AGRICULTURAL CHEMICAL COMPANY

GENERAL OFFICE: 50 CHURCH STREET, NEW YORK 7, N. Y.

30 FACTORIES AND SALES OFFICES, SERVING U.S., CANADA AND CUBA—ASSURE DEPENDABLE SERVICE

Here's another way LION IS HELPING YOU sell more Nitrogen Fertilizer

Impressive, Big-Space Advertisements are Appearing Month-After-Month in all These Publications

Lion's Chemical Sales Division is working to make sure you, as a fertilizer mixer, sell more fertilizers. One way we help is by consistent advertising to dealers and farmers. This advertising emphasizes how plant foods can best serve the farmer by increasing his profits.

We also offer One-Stop Service—which means you can contract for your nitrogen requirements from a single dependable source, saving you time (which, these days, is money!). As for *quality*, you can build your own reputation on a solid basis when you depend on Lion quality.

And when you need assistance with a formulation problem, our skilled Lion technical staff is ready to help you.

Our great storage facilities and the variety and flexibility of our manufacturing operations assure you of prompt shipment.

LION—A LEADER IN PETRO-CHEMICALS OFFERS:

Lion Anhydrous Ammonia—For formulation. A uniformly high-quality basic product. Nitrogen content, 82.2%.

Lion Aqua Ammonia—For formulation or acid oxidation. Ammonia content about 30%. Other grades to suit you.

Lion Ammonium Nitrate Fertilizer—For formulation or direct application. Improved spherical pellets. Guaranteed 33.5% nitrogen. Flows freely, spreads evenly.

Lion Nitrogen Fertilizer Solutions—For formulation. Three types to suit varying weather and manufacturing conditions.

Lion Sulphate of Ammonia—For formulation or direct application. Uniform, free-flowing crystals. Guaranteed to contain a minimum of 21% nitrogen.

DISTRICT SALES OFFICES:

NATIONAL BANK OF COMMERCE BUILDING, NEW ORLEANS, LOUISIANA • SHEPHERD BUILDING, MONTGOMERY, ALABAMA

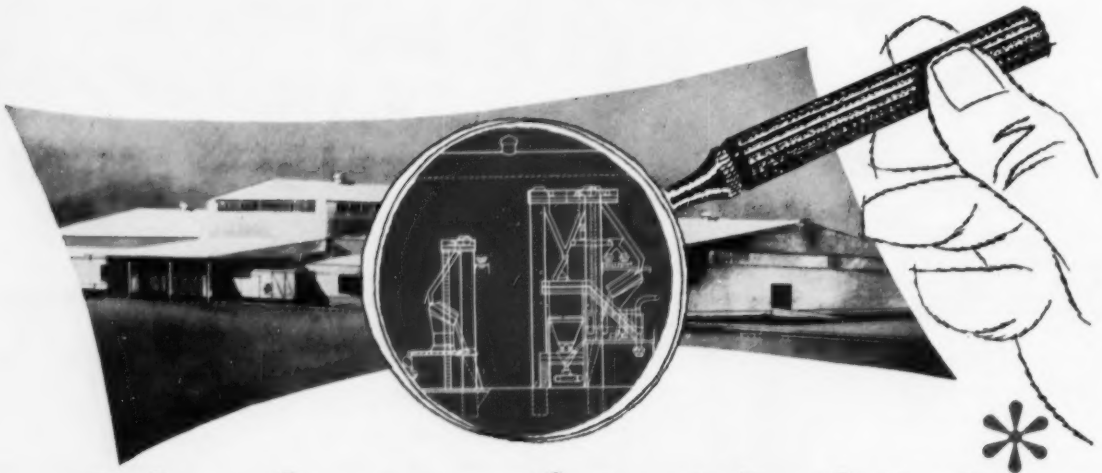
WORLD'S LARGEST MANUFACTURER OF PRILLED AMMONIUM NITRATE

LION OIL COMPANY

CHEMICAL SALES DIVISION

EL DORADO, ARKANSAS

LION



Take advantage of Specialized Design for your FERTILIZER PLANT

Many years of experience in the fertilizer industry have given the Harte Company valuable knowledge about the development and application of the fertilizer processes. Extensive study and research have made Harte engineers cognizant of the over-all picture of fertilizer plant design, realizing that certain fundamentals must be followed while specializing each plant. Chemical processes, machinery, mechanical operations, production facilities are carefully studied and adapted to fit the needs of each individual fertilizer plant.

The diversified experience and 'know-how' of Harte engineers are available to aid you in your fertilizer plant design. If you plan to build a fertilizer mixing plant, or an associated plant, the Harte organization can handle your complete job or any part from original design to an operating plant . . . anywhere, assuring economy and speed.

Harte Engineers are Specialists in:

- **Fertilizer Mixing Plants**
- **Triple Superphosphate Plants**
- **Single Superphosphate Plants**
- **Warehouses**
- **Granulating Plants**
- **Ammonium Sulphate Plants**
- **Storage Buildings**
- **Material Handling Systems**
- **Sulphuric Acid**
- **Phosphoric Acid**

ENGINEERS
CONSTRUCTION MANAGERS

JOHN J. HARTE COMPANY

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and PLANT FOOD INDUSTRY

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Commenting Freely

by BRUCE MORAN

Time was when wives had 10 kids, but still called the husband Mister in private as well as in public. Time was when Management ignored personnel and only the foreman knew the names of the men at the machines.

And time was when a railroad man is supposed to have said "To hell with the Public."

But that time is not now. Things are different. Competitors may snarl at each other privately—but when they meet face to face they are on a first-name basis, and play poker together in the back rooms at conventions.

Personnel relations are worked out these days on a systematic, if not scientific basis . . . and, until the shop gets just too big, the boss knows everybody's first name, and how many kids there are in the family.

But when it comes to relations with the community, times have hardly changed at all. And that is something badly needing attention. We constantly run across examples of weak spots in the relationships between our industry and the folks they live among. "Neighbor troubles" result. The County is petitioned to remove "this nuisance" . . . the courts are asked to enjoin it.

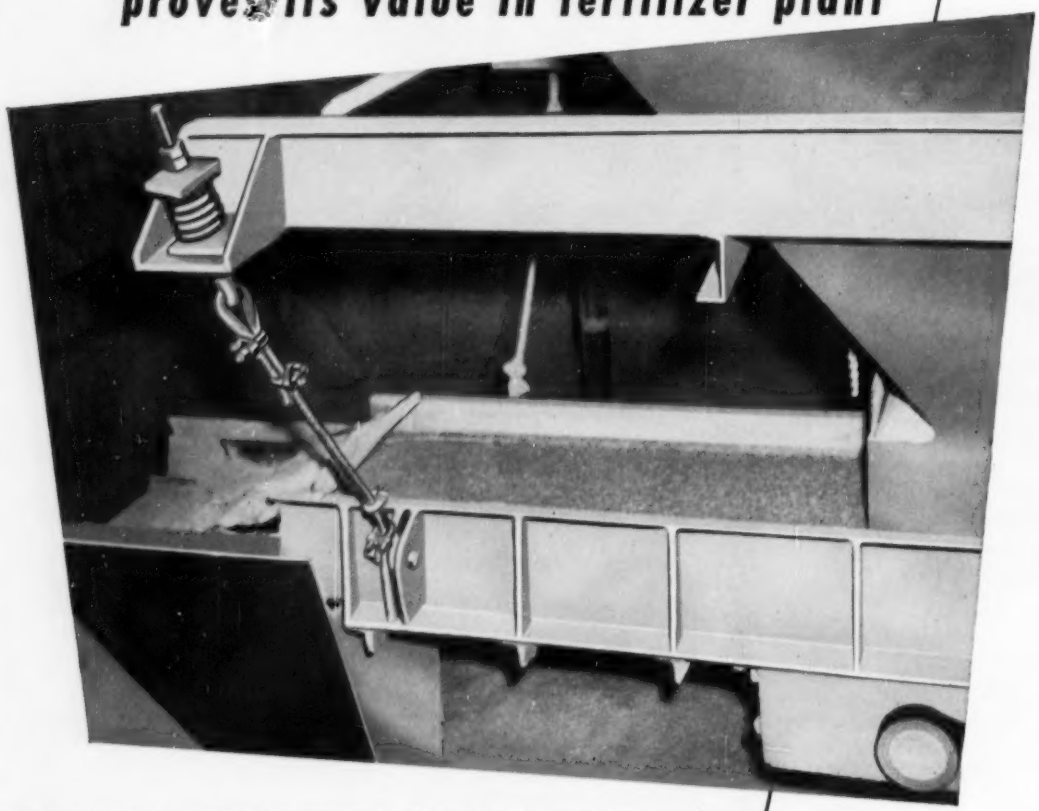
What do you suppose is the effect of this on farmers, semi-urban dwellers, and others who should be ready prospects for the home-town fertilizer? To say the least, it does not encourage sales.

And the answer is better community relations, better public relations, a more intelligent attitude toward those people we have to live with, customers or not.

SIMPLICITY

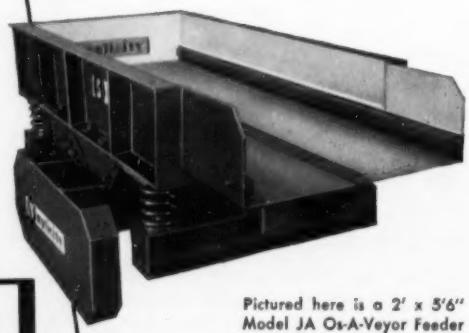
OS-A-VEYOR FEEDER

proves its value in fertilizer plant



Wisconsin FARMCO SERVICE Cooperative is utilizing this 18" x 6' Simplicity Os-A-Veyor Feeder to feed finished fertilizer from a bin to a bagger. The bagger is operating at 14 bags per minute. The rate of feed is controlled by a gate on the bin.

Simplicity Os-A-Veyor Feeders are designed to handle heavy column loads. They feed along their entire length and allow for the use of a larger bin . . . thus eliminating the problem of material bridging in the bin. Simplicity Feeders may be suspended with spring and cable arrangement from the bin above as shown in the picture, or may be spring mounted. They will feed on the horizontal, as pictured . . . thus requiring less headroom. They feature replaceable liners and can be provided with grizzly or screen sections, one or two decks, and can be totally enclosed. If a screening or feeding problem exists in your fertilizer plant, call on a Simplicity sales representative and find out about Simplicity units, now in wide use throughout the fertilizer industry.



Pictured here is a 2' x 5'6" Model JA Os-A-Veyor Feeder

Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND 3, MICH.

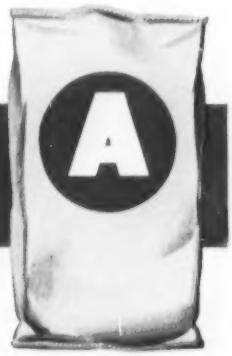
SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.
FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario
FOR EXPORT: Brown and Sites, 50 Church St., New York 7, N. Y.

160

"A Short Horse Is Soon Curried"

In Albemarle's completely integrated Multiwall operation small orders look as "well groomed", receive as careful attention as the big jobs. Color printing? Colored Kraft? "A horse of another color"... but they are Albemarle specialties too.

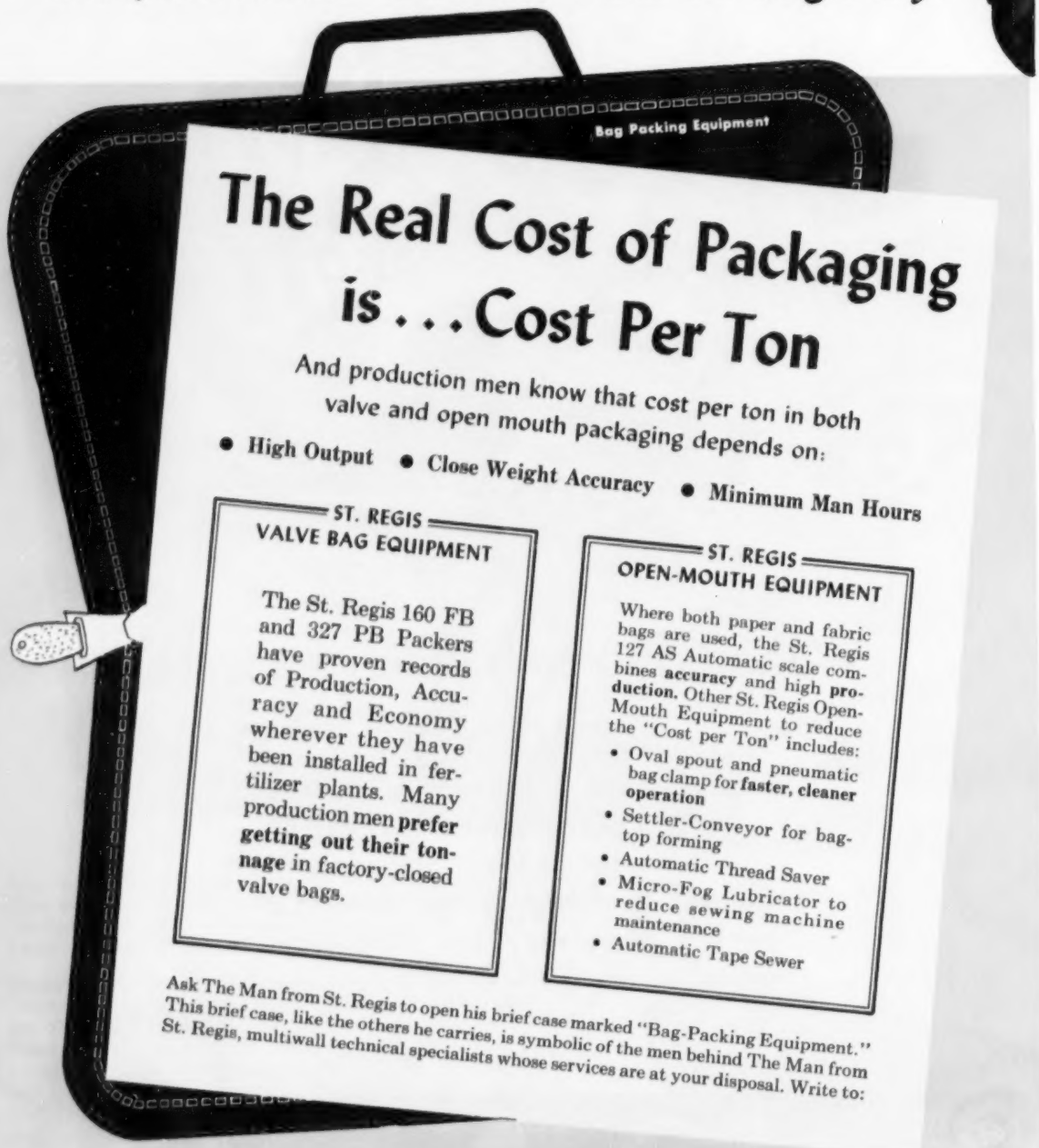
FOR *Multiwall* CALL **Albemarle**



ALBEMARLE PAPER MANUFACTURING COMPANY • RICHMOND, VIRGINIA

EASTERN SALES OFFICE: NEW YORK CITY • SOUTHERN SALES OFFICE: BALTIMORE, MD. • MIDWEST SALES OFFICE: CHICAGO, ILLINOIS

The Men behind **The Man from St. Regis** *say:*



The Real Cost of Packaging is . . . Cost Per Ton

And production men know that cost per ton in both valve and open mouth packaging depends on:

• **High Output** • **Close Weight Accuracy** • **Minimum Man Hours**

ST. REGIS
VALVE BAG EQUIPMENT

The St. Regis 160 FB and 327 PB Packers have proven records of Production, Accuracy and Economy wherever they have been installed in fertilizer plants. Many production men **prefer getting out their tonnage** in factory-closed valve bags.

ST. REGIS
OPEN-MOUTH EQUIPMENT

Where both paper and fabric bags are used, the St. Regis 127 AS Automatic scale combines **accuracy** and high **production.** Other St. Regis Open-Mouth Equipment to reduce the "Cost per Ton" includes:

- Oval spout and pneumatic bag clamp for **faster, cleaner operation**
- Settler-Conveyor for bag-top forming
- Automatic Thread Saver
- Micro-Fog Lubricator to reduce sewing machine maintenance
- Automatic Tape Sewer

Ask The Man from St. Regis to open his brief case marked "Bag-Packing Equipment." This brief case, like the others he carries, is symbolic of the men behind The Man from St. Regis, multiwall technical specialists whose services are at your disposal. Write to:

OTHER BRIEFCASES TO BE OPENED—

MULTIWALL PACKAGING DIVISION

ST. REGIS PAPER COMPANY

Sales Subsidiary—St. Regis Sales Corporation, 230 Park Avenue, New York 17, N. Y.

in the bag

It adds to your fertilizer's effectiveness!

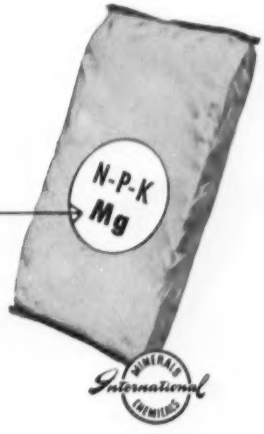
on the bag

Mg tells the farmer your brand contains soluble magnesium!

added sales with

Sul-Po-Mag®

Water-Soluble Double Sulfate of Potash-Magnesia
($K_2SO_4 \cdot 2MgSO_4$) 22% K_2O—18% MgO



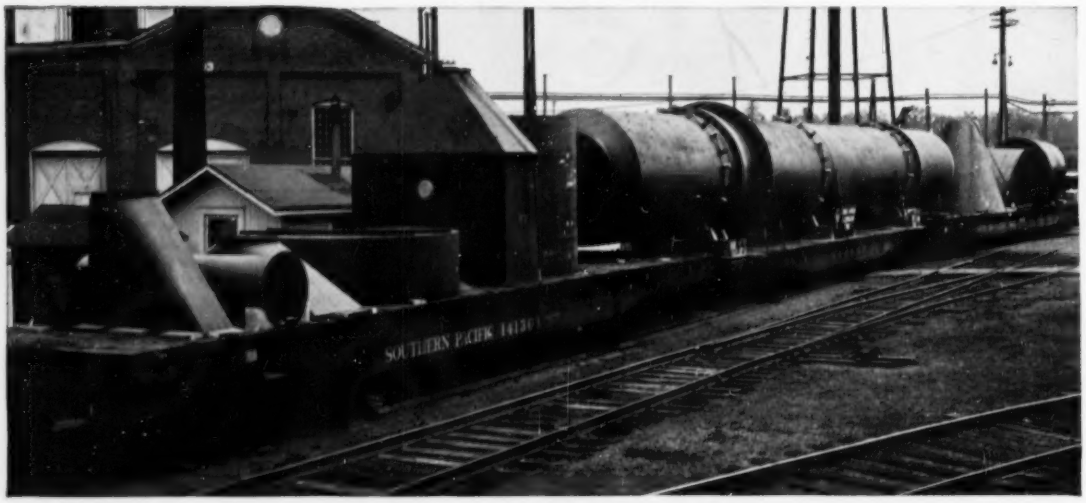
Sul-Po-Mag is produced exclusively by the *Potash Division* for use in quality mixed fertilizers and is also bagged for direct application. It makes fertilizers more effective by supplying water-soluble *sulfate of magnesium* in balanced combination with *sulfate of potash*, a premium form of potash. As an ingredient in mixed fertilizers, *Sul-Po-Mag* is the most satisfactory way for farmers to supply soluble magnesium . . . called, in many areas, *the fourth element in the fertilizer bag*. At Carlsbad, New Mexico, the *Potash Division* mines and refines these quality products for fertilizer manufacturers—Muriate of Potash, Sulfate of Potash and *Sul-Po-Mag*.

potash division • INTERNATIONAL MINERALS & CHEMICAL CORPORATION • GENERAL OFFICES: 20 NORTH WACKER DRIVE, CHICAGO 6

more and more
granulated
fertilizer manufacturers
are turning to

LOUISVILLE rotary dryers
rotary coolers

to speed production ... reduce drying costs



Installations are individually engineered for your problems. Results can be pre-determined in our pilot plant. We'll be glad to show you how the fertilizer industry has found a new way to efficient and profitable drying.

A Louisville engineer will survey your present operation without obligation on your part. Take advantage of Louisville's equipment and experience. Phone or write today.

PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

Over 50 years of creative drying engineering

GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer Sales Office: 380 Madison Avenue, New York 17, New York
139 South Fourth Street, Louisville 2, Kentucky
General Offices: 135 South LaSalle Street, Chicago 90, Illinois
In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario
Offices in all principal cities

MURIATE OF POTASH

THIS symbol stands for high-grade coarse and uniform Muriate of Potash (60% K_2O minimum). Southwest Potash Corporation provides a dependable supply of HIGH-K* Muriate for the plant food industry.

*Trade Mark

Southwest Potash Corporation

[redacted]

between you and this page

. . . is roughly one cubic foot of NITROGEN gas. Floating free in the air this nitrogen can't add to America's agricultural or industrial wealth. But Grace Chemical Company has opened a plant in Memphis, Tennessee, that "fixes" atmospheric nitrogen in the form of two very versatile compounds—ammonia and urea. (Shown in the photo are prills—tiny beads—of urea containing the equivalent to the amount of nitrogen gas between you and this page.)

Fixed in this way, nitrogen can enrich our crop farms, our livestock, and our homes—through its use in fertilizers, feed supplements, and the manufacture of products ranging from toothpaste to television cabinets.

Output of the $20,000,000 Memphis plant will be 72,000 tons of nitrogen a year. It will provide industry and agriculture these two forms of nitrogen from a *dependable* source—backed by a world of experience.

For AMMONIA and UREA look to —

GRACE CHEMICAL COMPANY

HANOVER SQUARE, NEW YORK, N. Y. • ATLANTA, GA. • CHICAGO, ILL. • MEMPHIS, TENN.

1. RUN-OF-PILE FOR MAXIMUM AMMONIATION
2. GRANULAR FOR DIRECT APPLICATION
3. PROMPT SERVICE TO MEET EVERY REQUIREMENT

Nearly 30 years of experience in the production of superior phosphate fertilizers are behind every shipment of U. S. Phosphoric Products Triple Superphosphate. Ask your Bradley & Baker sales representative to help you plan your shipments.

TC
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U.S. PHOSPHORIC PRODUCTS
Division
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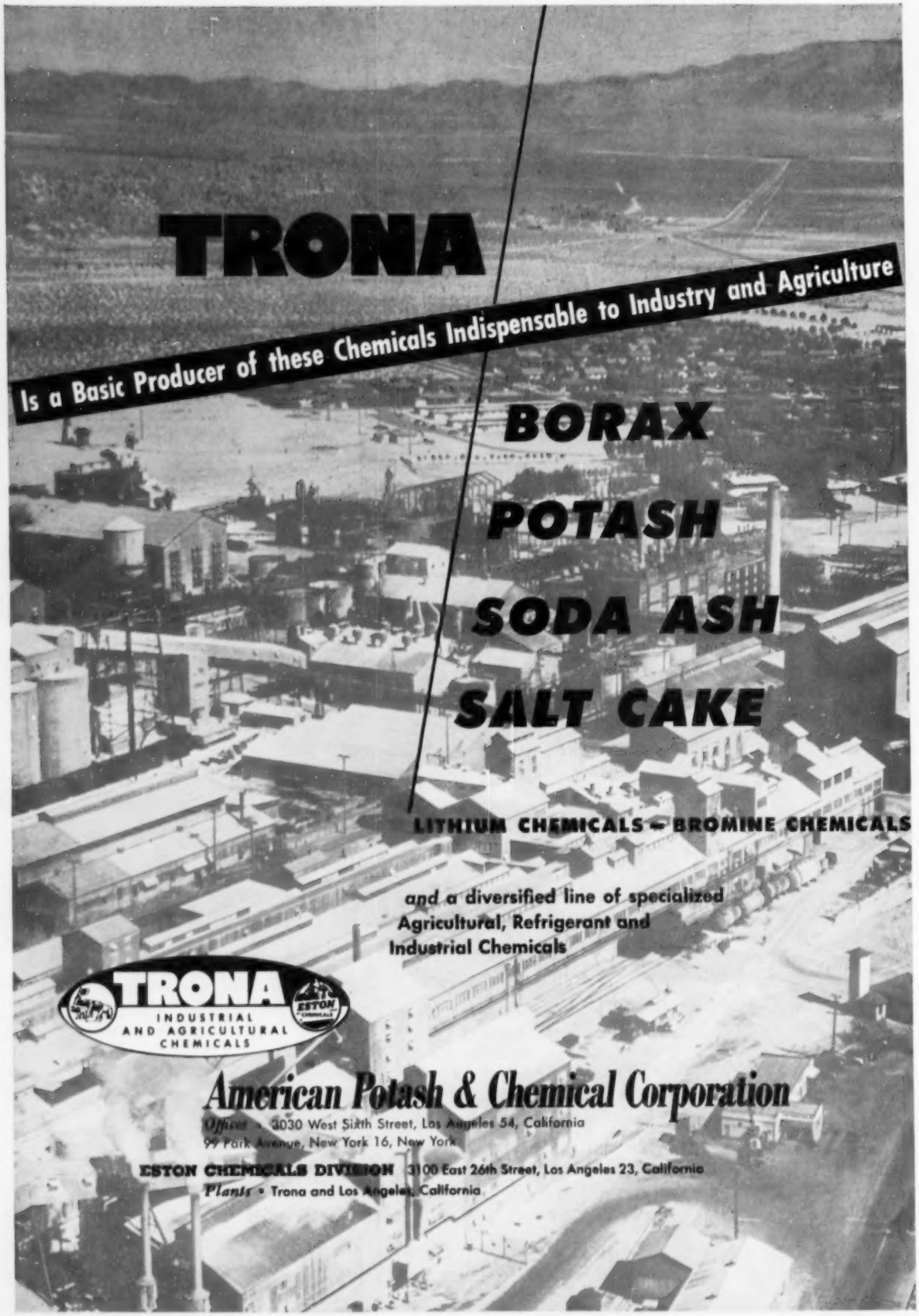
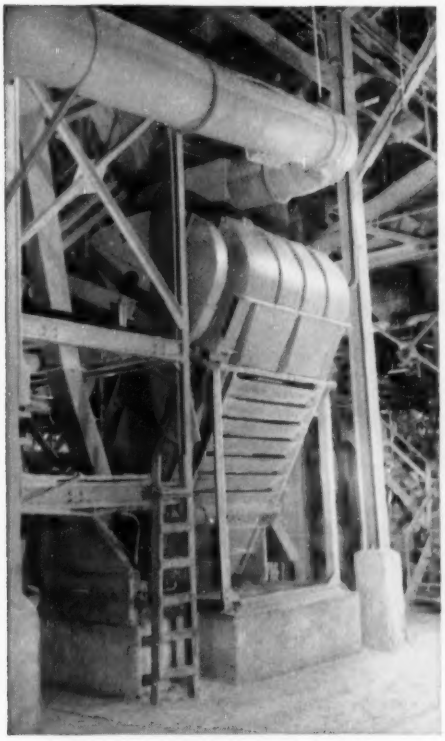
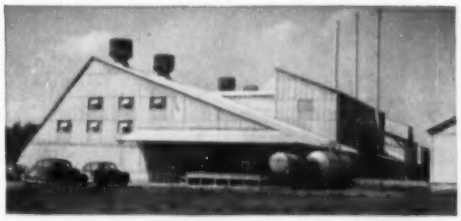

TRONA
Is a Basic Producer of these Chemicals Indispensable to Industry and Agriculture
BORAX
POTASH
SODA ASH
SALT CAKE
LITHIUM CHEMICALS – BROMINE CHEMICALS
and a diversified line of specialized
Agricultural, Refrigerant and
Industrial Chemicals
TRONA
INDUSTRIAL
AND AGRICULTURAL
CHEMICALS
ESTON
American Potash & Chemical Corporation
Offices • 3030 West Sixth Street, Los Angeles 54, California
99 Park Avenue, New York 16, New York
ESTON CHEMICALS DIVISION 3100 East 26th Street, Los Angeles 23, California
Plants • Trona and Los Angeles, California

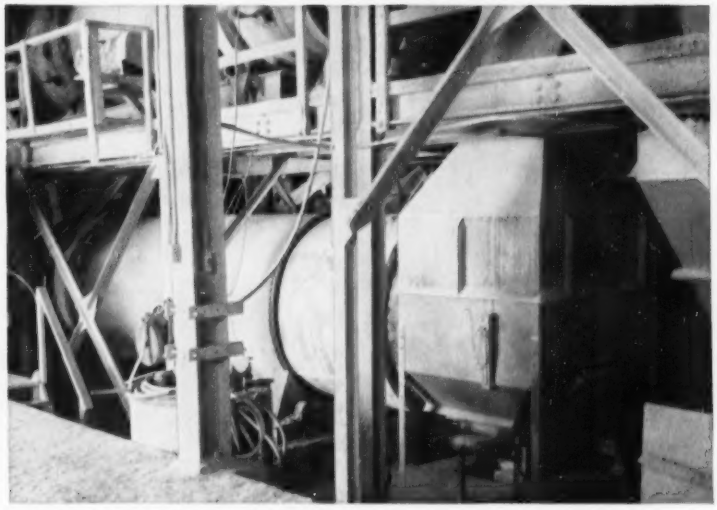
Need processing, transmission or conveying equipment ... counsel ... or a complete fertilizer plant?

Get any or all from LINK-BELT



50% more production resulted at Iowa Farm Supply Co., Des Moines, through the aid of Link-Belt engineering counsel. Link-Belt equipment here includes Multi-Louvre Cooler (left), Roto-Louvre Dryer (below), bucket elevator, vibrating screens and power transmission machinery.





Here's how you can produce higher grade fertilizer ... at lower cost

THIS plant demonstrates what can be accomplished with the right choice of dependable equipment plus sound engineering methods. And you can count on Link-Belt for similar high efficiency — with needs ranging from a complete plant to a few pieces of equipment.

Link-Belt can accept total responsibility for design, equipment and erection of complete, modern fertilizer plants under a single contract. Qualifications include a broad line of quality handling and processing equipment ... plus experience with dry-mix, superphosphate, nitrophosphate, ammonium nitrate, ammonium sulphate, urea, granulation and other plants.

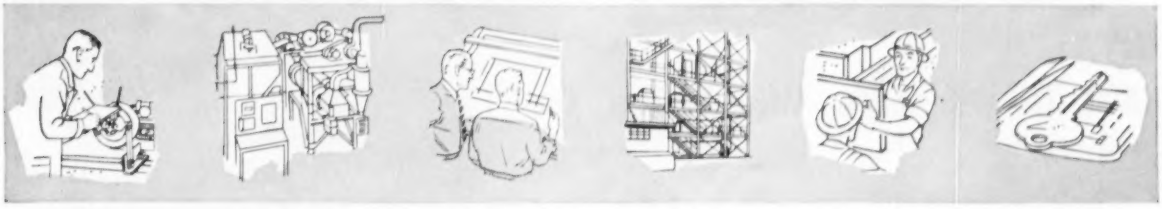
Call your nearest Link-Belt office for an analysis of your requirements, however large or small. Our engineers will work directly with you or your consultants ... help you produce better fertilizer at lower cost. Write today for a copy of Book No. 2459.

LINK-BELT

CONVEYING AND PROCESSING EQUIPMENT

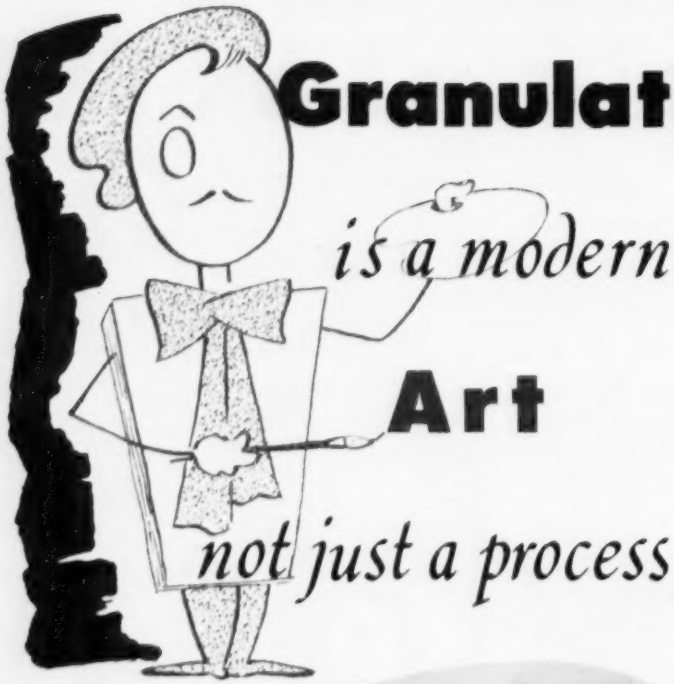
Here's what Link-Belt offers you under a single-contract responsibility

13.055



MODERN LABORATORIES | PILOT AND TESTING STATION | EXPERIENCED ENGINEERING | QUALITY EQUIPMENT | SKILLED ERECTION CREWS | SATISFACTORY PERFORMANCE

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

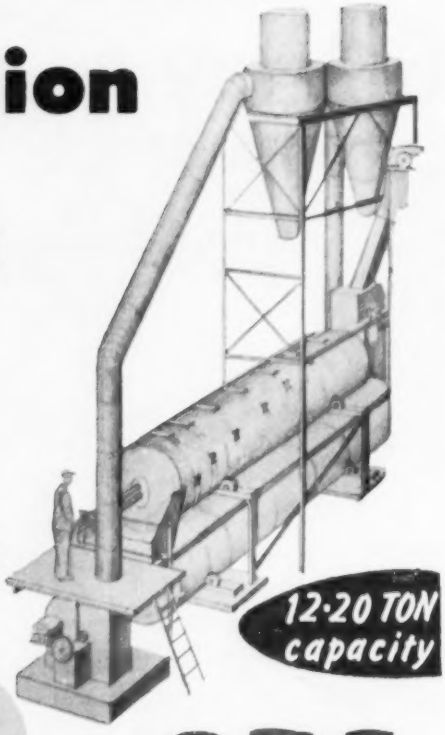


Granulation

is a modern

Art

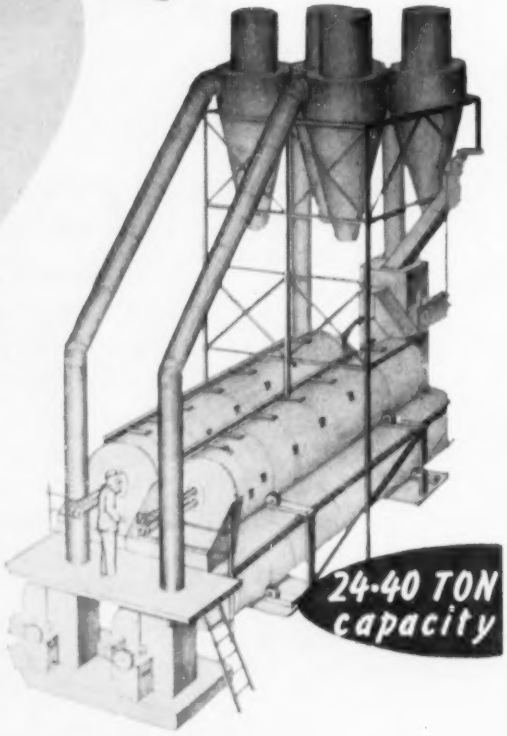
not just a process



The operation of granulation equipment is a modern art . . . developed just like the artist's technique . . . through skill and experience!

BLUE VALLEY engineers are the leaders in the granulation field! They have sold the right tools and taught the art of granulation to plants throughout the United States and Canada.

Investigate the installation of a BLUE VALLEY granulator in your plant to reduce curing time to hours . . . cut plant inventories . . . and above all, to increase your profits and give your customers a higher quality product!



GRANULATE THE GLASPEY WAY with a——

Blue Valley

Granulator

Blue Valley Equipment Mfg. and Engr. Co.

Laurent & N. Taylor Sts. Topeka, Kansas

JUST AROUND THE CORNER *by Vernon Mount*

"BUT KEEP YOUR POWDER DRY". The attitude of Washington seems to reflect growing confidence that we are not going to have a war with Russia any time soon, if ever. But the old Theodore Roosevelt maxim still holds--"Walk softly, but carry a big stick".

PREPAREDNESS still stands as the best preventive of war. So long as we can dominate the air and the atom-weapon field, so long as we can retaliate swiftly and thoroughly...that long we will be safe. And while the Eisenhower policy is reduction of armed forces, the policy is definitely also toward greater and greater defensive and retaliatory power.

OUR ECONOMIC POSITION, therefore, still contains military materiel as a major factor, and will continue to do so. Which means continued high level of National Output, and continued high incomes for most of our people. Be guided by that in your planning.

Yours faithfully,

Vernon Mount

Farmers depend on ARMOUR FERTILIZERS

31 FACTORIES
CONVENIENTLY LOCATED
TO SERVE YOU

Albany, Georgia
Atlanta, Georgia
Augusta, Georgia
Baltimore, Maryland
Bartow, Florida
Birmingham, Alabama
Carteret, New Jersey
Chicago Heights, Illinois
Cincinnati, Ohio
Columbia, South Carolina
Columbus, Georgia
Dallas, Texas
East St. Louis, Illinois
Greensboro, North Carolina
Houston, Texas
Jacksonville, Florida
Jeffersonville, Indiana
Memphis, Tennessee
Montgomery, Alabama
Nashville, Tennessee
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Norfolk, Virginia
North Kansas City, Missouri
Presque Isle, Maine
Sandusky, Ohio
Siglo, Tennessee
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Also sales offices in Havana, Cuba, and San Juan, Puerto Rico

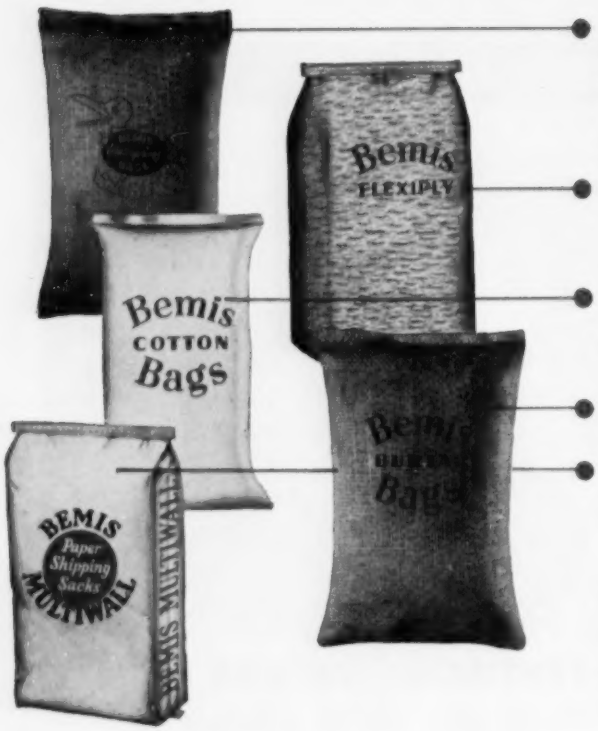
ARMOUR FERTILIZER WORKS
General Office, P. O. Box 1685, Atlanta 1, Georgia

from A to Z

ammonium nitrate

zinc sulfate

fertilizers and ingredients travel economically in Bemis Bags



Which types of Bemis Bags? Here's a good yardstick . . .

Bemis Waterproof (laminated-textile) Bags if you have a really hard-to-pack fertilizer or fertilizer ingredient—one that requires special protection against moisture gain or loss, escape of odors, loss from snagging or tearing. This is the strongest shipping bag made—particularly suitable for export.

Bemis Flexiply Bags if you need a little less than the super-protection of Bemis Waterproof Bags. These laminated, all-crinkled paper bags are tough, shock-resistant, flexible . . . handle and stack easily.

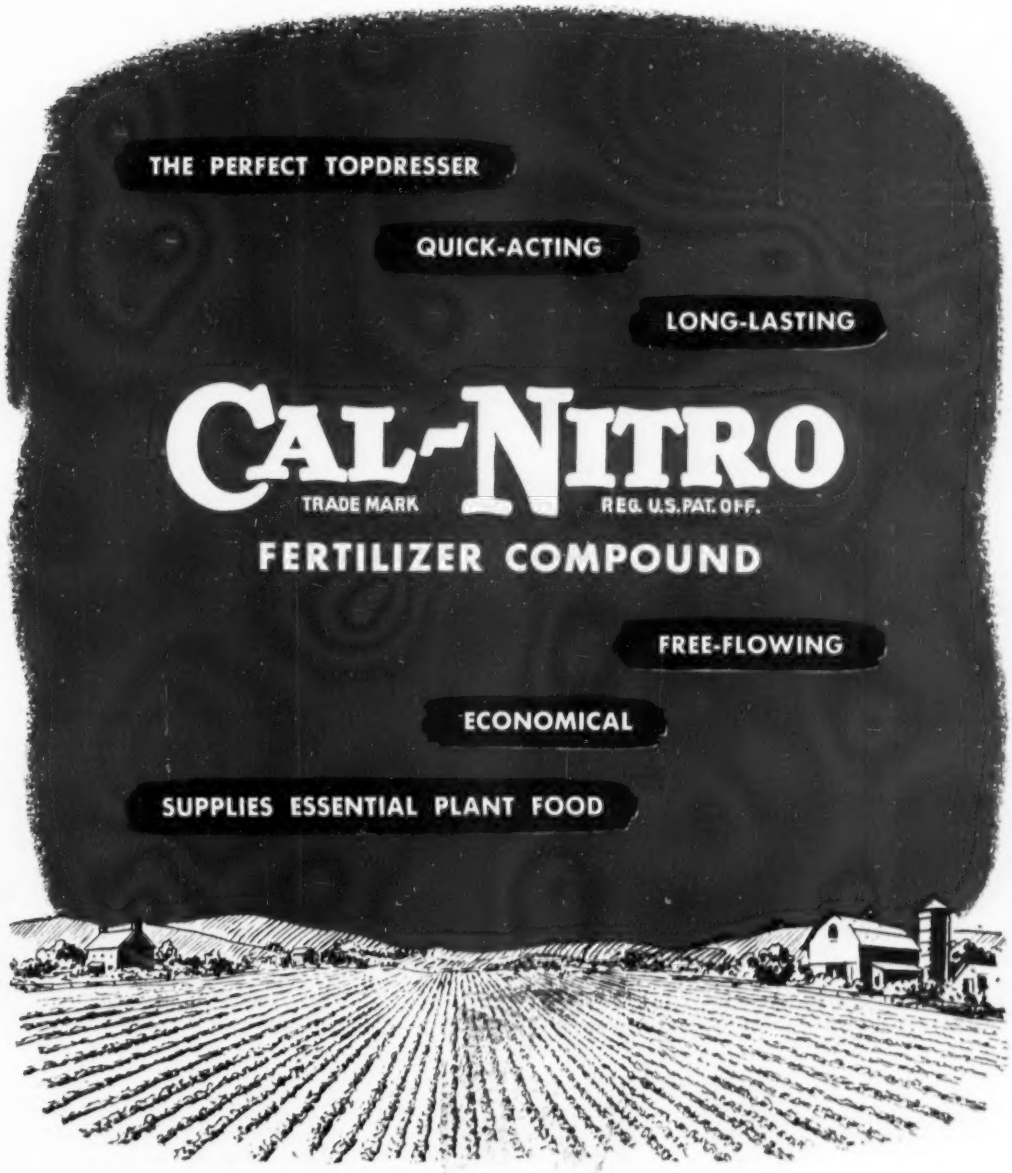
Bemis Cotton Bags if you want a sturdy, attractive bag with sales appeal and top-brand reproduction. Bemis Cotton Bags, white or dress print, are popular for their secondary household uses.

Bemis Burlap Bags if you are after maximum mileage . . . durable and economical.

Bemis Multiwalls if you want quality paper bags with the best multicolor brand printing in the bag business.

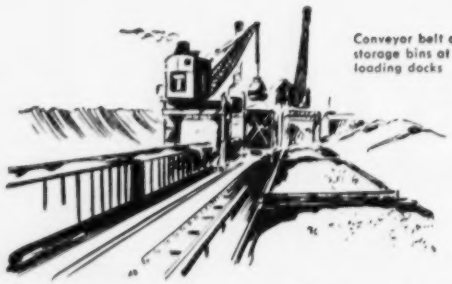
Bemis

408 Pine St., Box 46
St. Louis 2, Missouri



Cal-Nitro is the nationally known trade mark for the outstanding nitrogen topdressing material. Cal-Nitro contains 20.5% nitrogen, and at least 20% Calcium Oxide equivalent. It supplies crops with essential plant food in a free-flowing form that acts fast, lasts long and is economical. Packed in 100 lb. bags.

SYNTHETIC NITROGEN PRODUCTS CORPORATION, 285 MADISON AVENUE, NEW YORK 17, N. Y.



Conveyor belt and storage bins at loading docks

Crude Sulphur

for Industrial Use

from the properties of

Texas Gulf Sulphur Co.

75 East 45th Street • New York 17, N. Y.

Producing Units

- **NEWGULF, TEXAS**
- **MOSS BLUFF, TEXAS**
- **SPINDLETOP, TEXAS**
- **WORLAND, WYOMING**

A&S Super Ruff Multiwalls

GIVE 40% MORE ANTI-SLIDE INSURANCE!

SUPER-RUFF
kraft multiwalls printed with SUPER-GRIP inks
do NOT slide at a 28° angle!

STANDARD
kraft multiwalls printed with STANDARD
inks slide off at 20° angle!

Specially-formulated SUPER-GRIP inks printed by ARKELL & SMITHS on SUPER-RUFF kraft provide additional adhesive assurance against sliding of stockpiled multiwall bags.

When bags are placed on pallets, several other methods may be used to lock the bags in place.

1. **Factory applied adhesive or non-slip application, sprayed or rolled on: A&S STIK-PAK.**
2. **Use of creped outer ply. A&S STA-STAK.**
3. **Adhesive applied by user when building pallets. Write for the 10 page A&S booklet on "PALLETIZING FILLED MULTIWALL BAGS." Address A&S Packaging Service, Canajoharie, New York.**

with

Super Slide-Proof A&S Multiwalls! . . . Super-Ruff Kraft and Super-Grip Inks!

ARKELL & SMITHS Super-Ruff multiwall bags for your products do a packaging job with SALES PLUS values:

SPECIALLY-TREATED A & S SUPER-RUFF Kraft for multiwalls assures maximum ease in handling PLUS greater product protection. Super-Ruff bags can be stacked high, and they stay put, without sliding and slipping.

The famous A & S Package Design Department works out sales-catching, bright, and unique designs which establish *your* brand, wherever *your* package is seen—by Dealers—and over-the-counter buyers.

With bag-paper supplied by 4 outstanding mills and with Research continuing in each of the 4 A & S bag-making plants, customers are assured of the best possible combination of services—to deliver the goods, *when* and *where* they are needed.

A & S customers buy *experience* and *imagination*—the know-how of the oldest name in paper bags—almost a century of practical, efficient production.

Write, wire or phone A & S for complete information on Super-Ruff bags and other ARKELL & SMITHS special-packaging materials. Address Package Engineering Department, Canajoharie, New York.

ARKELL and SMITHS

"THE OLDEST NAME IN PAPER BAGS"

the D-K Mixer

A new addition to the Davidson-Kennedy line of fertilizer machinery is the D-K Mixer. Available in one-half, one and two ton capacities, it is of sturdy, heavy-duty construction with high carbon, high wear resistant steel plate. Mixer flights consist of special alloy steel plates arranged to give complete mixing of dry and semi-dry materials in the shortest possible cycle. The new D-K Mixer, typical of all Davidson-Kennedy fertilizer equipment, will perform efficiently and economically and give a lifetime of trouble-free service. Write today for complete information.

- Sealed mixing unit contains self take-up neoprene seal in inlet.
- Wheel bearings are sealed to keep grease in and dust out. Lubrication fittings are stationary and easily accessible.
- Direct drive is connected with flexible coupling to totally enclosed fan cooled motor. (optional)
- Charge and discharge gates are hand operated or air operated. (optional)
- Ample clean-out doors and manhole are provided for access to mixer drum.
- One ton mixer requires only 90" x 82" floor space.

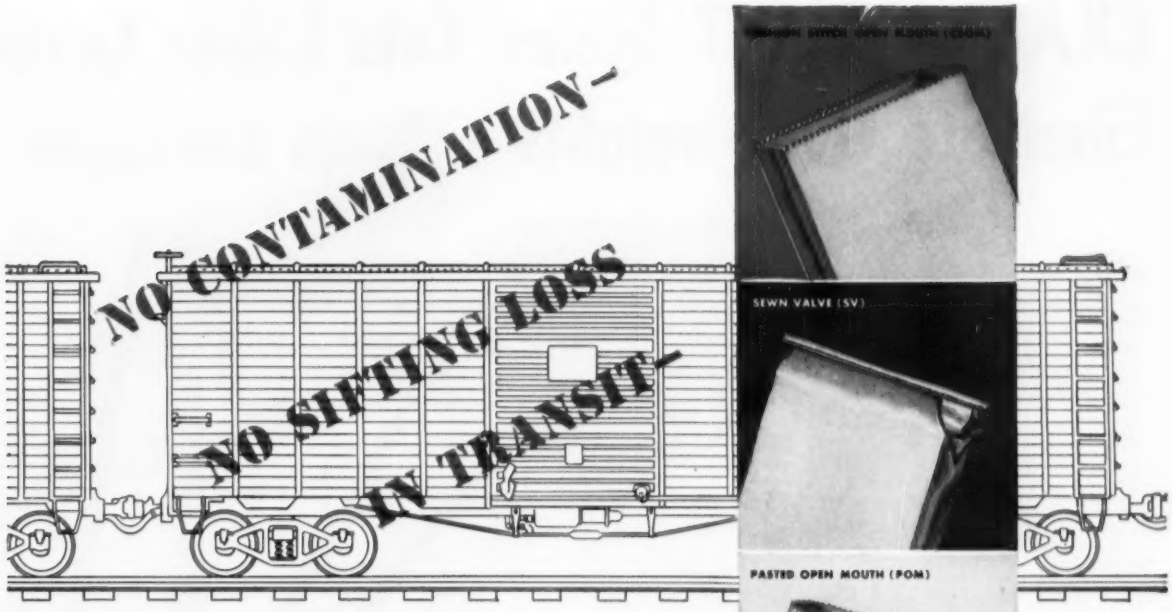
Complete fertilizer design, engineering, fabrication and construction supervision service.

Hopper systems Automatic solution tanks Vibrating screens Pulverizers Clod breakers Elevators Conveyors Mixers

DAVIDSON-KENNEDY CO.

ATLANTA D-K GEORGIA

U.S.A.



when you bag in

BAGPAK

Multiwalls

Bagpak Multiwalls assure constant, perfect protection against loss and contamination in transit and storage. Bagpak offers five basic types of Multiwall Bags for proper packing and shipping of every type of commodity:

- *Cushion Stitch Open Mouth (CSOM)*
- *Sewn Valve (SV)*
- *Pasted Valve (PV)*
- *Pasted Open Mouth (POM)*
- *Automatic (SOS)*

Bagpak Multiwalls are saving time and money, piling up profits for manufacturers the country over.

To find out how Bagpak Multiwalls can paint a better profit picture places you under no obligation.

Just write: C-21
International Paper Company, Bagpak Division
220 E. 42 Street, New York 17

International Paper COMPANY

BAGPAK DIVISION

BRANCH OFFICES: Atlanta · Baltimore · Baxter Springs, Kansas · Boston · Chicago · Cincinnati · Cleveland · Dallas · Denver · Des Moines · Detroit · Kansas City, Kansas · Los Angeles · Louisville · Minneapolis · New Orleans · Philadelphia · Pittsburgh · St. Louis · San Francisco · IN CANADA: The Continental Paper Products, Ltd., Montreal, Ottawa, Toronto

EXACT WEIGHT Scales Cuts Labor Costs Eliminate Over-weights

MODEL 2224
SACKING SCALE

One simple operation does the work of three with the EXACT WEIGHT Sacking Scale. One man can bag, weigh, and check over 100 tons of free-flowing materials per day from overhead hopper to foot level conveyor. Savings in time plus savings in overweights quickly pay for an installation.

In addition to the pedestal type illustrated EXACT WEIGHT Sacking Scales are available in overhead and portable mountings. Also come complete with electrical or air-operated valves for automatic operation.

MODEL 1302-R CHECKWEIGHING SCALE

This model can be built right into your conveyor line, above floor or recessed mounting. It gives you accurate, split-second checkweighing, checks every bag and eliminates costly overweights. Controlled travel with hydraulic damping action brings indicator to rest quickly for fast, accurate reading. Standard capacity—100 lbs.

Sales and Service
Coast to Coast

Exact Weight Scales
Better quality control
Better cost control

THE EXACT WEIGHT SCALE COMPANY

906 W. Fifth Avenue, Columbus 8, Ohio
In Canada: P. O. Box 179, Station S, Toronto 18, Ont.

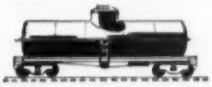
PHILLIPS OFFERS

5 FERTILIZER MATERIALS FOR HIGH ANALYSIS MIXTURES

1 AMMONIUM SULFATE

New Premium Quality Phillips *66* Ammonium Sulfate contains 21% nitrogen, 23.8% sulfur. It is *dry*-cured to remove excess moisture—prevent caking. Uniform, dust-free crystals flow freely—mix easily. Ideal for all analyses of mixed goods and for direct application. Available in bags or bulk.

2 ANHYDROUS AMMONIA



Phillips *66* Agricultural Ammonia contains 82% nitrogen. It's a convenient, economical source of nitrogen for formulation. Tank car shipments are assured to Phillips contract customers by Phillips huge production facilities in the Texas Panhandle and at Adams Terminal near Houston, Texas.

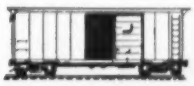
3 NITROGEN SOLUTIONS

Get more N per dollar! There are three Phillips *66* Nitrogen Solutions for use in preparation of high-analysis fertilizers and the ammoniation of superphosphate. These solutions keep handling costs low, help rapid, thorough curing.

4 AMMONIUM NITRATE

Phillips *66* Prilled Ammonium Nitrate contains 33% nitrogen. The small, coated prills or pellets resist caking . . . handle easily. Depend on Phillips *66* Prilled Ammonium Nitrate for uniform, free-flowing properties in formulations and top-notch crop response as a direct application material.

5 TRIPLE SUPERPHOSPHATE



Phillips *66* Triple Superphosphate contains 46% available phosphoric acid. Ideal for use in formulation of high analysis fertilizers.

Phillips 66

PHILLIPS CHEMICAL COMPANY

A Subsidiary of Phillips Petroleum Company, Bartlesville, Oklahoma

Offices in:

AMARILLO, TEX.—*First Nat'l Bank Bldg.*
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CHICAGO, ILL.—*7 South Dearborn St.*
DENVER, COLO.—*1375 Kearney Ave.*
DES MOINES, IOWA—*606 Hubbell Bldg.*
HOUSTON, TEX.—*1020 E. Holcombe Blvd.*
INDIANAPOLIS, IND.—*1112 N. Pennsylvania St.*
KANSAS CITY, MO.—*500 West 39th St.*
MINNEAPOLIS, MINN.—*212 Sixth St. South*
NEW YORK, N. Y.—*80 Broadway*
OMAHA, NEB.—*WOW Building*
PASADENA, CALIF.—*604 Citizens Bank Bldg.*
RALEIGH, N. C.—*804 St. Mary's Ave.*
SALT LAKE CITY, UTAH—*68 South Main*
SPOKANE, WASH.—*521 E. Sprague Ave.*
ST. LOUIS, MO.—*4251 Lindell Blvd.*
TAMPA, FLA.—*1214 South Dale Mabry*
TULSA, OKLA.—*1708 Utica Square*
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GOING GRANULAR?

switch to KRAFT-lok® bags!

10 good reasons
why packers of granulated fertilizer prefer KRAFT-lok Bags:
1 Eliminates snagging on packer tubes.
2 More flexible valve area improves bag handling.
3 Prevents torn sleeve particles from contaminating material.
4 Speeds up filling operations by more efficient "venting."
5 Slows up spilling in filling.
6 Reduces leakage in closing.
7 Actually seals material inside bag automatically.
8 Minimizes sifting in handling.
9 Makes a cleaner, more satisfactory package in all ways.
10 Saves dollars all around.
* 89.6% have already switched!
Gilman PAPER CO.
• St. Marys Kraft Corp.
• Gummed Tape Div.
• The Cellucord Corp.
• Kraft Bag Corp.

KRAFT BAG CORPORATION

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630 Fifth Avenue, New York 20, N. Y. • Daily News Bldg., Chicago 6, Ill.

1 Responsibility
2 Integrated Plants
3 Generations of Bag Experience

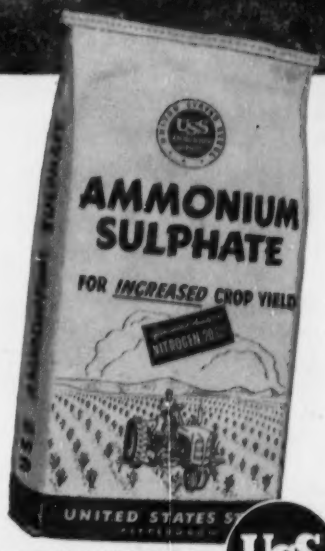
NOW is the time to sell
USS Ammonium Sulphate
. . . for emergency summer pastures

● A heavy nitrogen application is essential for good results from Sudan grass, millets and other emergency summer crops. This will bring a big demand for USS Ammonium Sulphate.

A top dress of 300 pounds per acre of USS Ammonium Sulphate at seeding time will promote quick growth of heavy grass sods, rich in protein. Point out that nitrogen on pastures has often doubled forage yields! Nitrogen helps grasses utilize available moisture better, too.

And, for even more sales, remind farmers that *additional* top dress with 200 pounds per acre of USS Ammonium Sulphate after their first grazing will give them fast regrowth for a good *second or third* grazing before frost comes. Regrowth will be uniformly lush. We are giving farmers this same message over radio in many areas.

USS Ammonium Sulphate is the ideal nitrogen source for farmers' summer pasture top dress. It is dry and free-flowing . . . less corrosive than other nitrogen materials. Stock up right away for this important summer market for USS Ammonium Sulphate.



USS AMMONIUM SULPHATE

USS

UNITED STATES STEEL

V-C® Experience Means Better Bags for You

Experienced inspectors watch every phase of V-C's bag-making operation. Shown above is inspection of pasted bags. Photo at right shows battery of sewing machines, and inspection of completed sewn bags on conveyor belt.

Experienced operators carefully apply sleeves in the manufacture of sewn-valve bags. Great care is necessary in this operation. An improperly inserted or aligned sleeve can cause sifting after the bag is filled.

DEPEND ON V-C's more than 50 years of bag-making experience to help solve your packaging problems. Long experience, manufacturing skill and top-grade materials, add up to better-built V-C Multiwall Bags that provide maximum protection for your product. V-C Multiwall Bags are designed to your needs, made two- to six-ply, and printed in one to four colors. Write for full information, or discuss your requirements with a V-C representative.

Virginia-Carolina Chemical Corporation

BAG DIVISION: 9th and Perry Streets, Richmond 5, Virginia

DISTRICT SALES OFFICES: Atlanta, Ga. • Wilmington, N. C. • New York, N. Y. • E. St. Louis, Ill. • Cincinnati, Ohio

FIRST IN THE FIELD

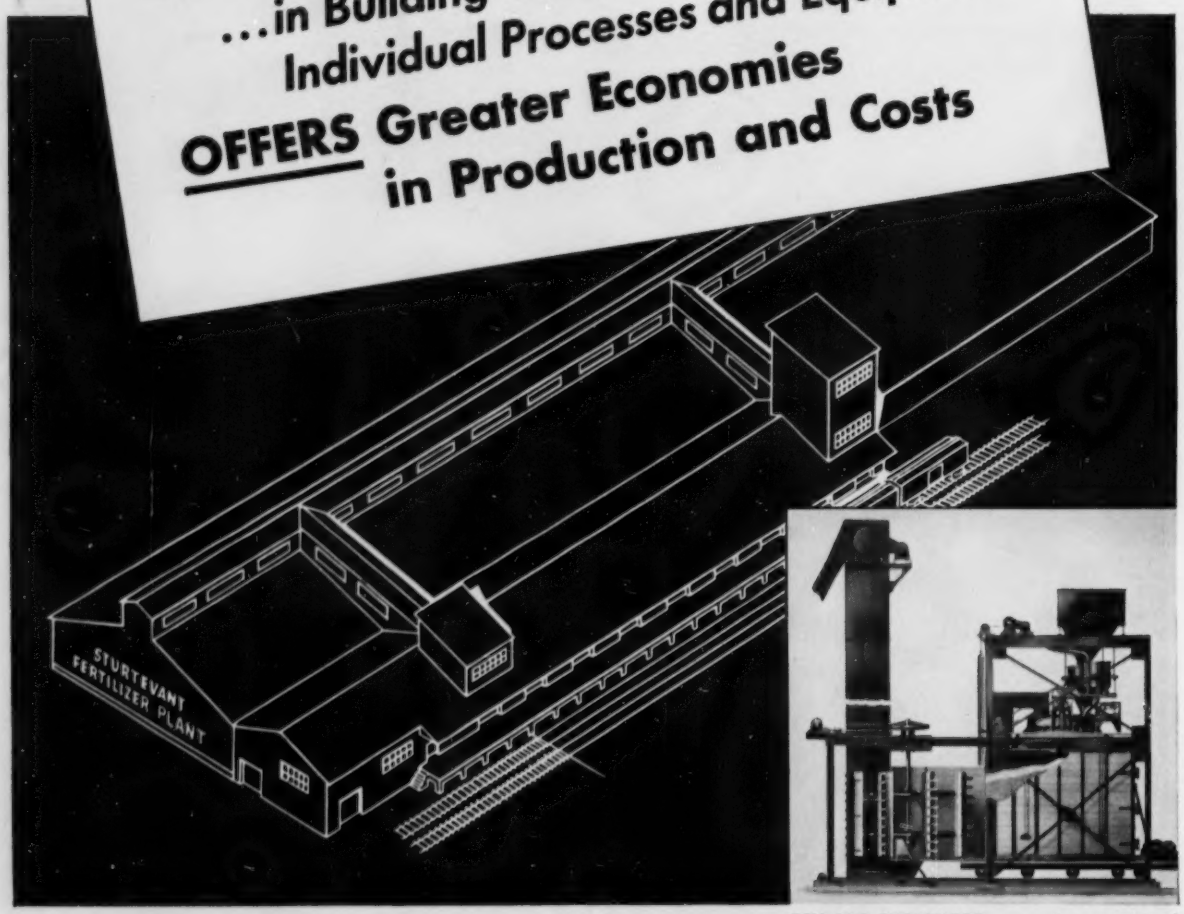
As the first producer of potash in New Mexico, the United States Potash Company is proud of the preference that the fertilizer trade has shown for its two products—

1. Higrade muriate of potash (62/63% K_2O)—tops in the trade for production of the new high analysis fertilizers.
2. Granular muriate of potash (60% K_2O min.)—tops in preference for certain types of fertilizers and for direct application.

These two fine products deliver better results—conclusive evidence that they are "first in the field."

UNITED STATES POTASH COMPANY
INCORPORATED
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.
Southern Sales Office Rhodes-Haverty Building, Atlanta, Georgia

Sturtevant Fertilizer Specialization ...in Building Complete Plants, Individual Processes and Equipment **OFFERS** Greater Economies in Production and Costs

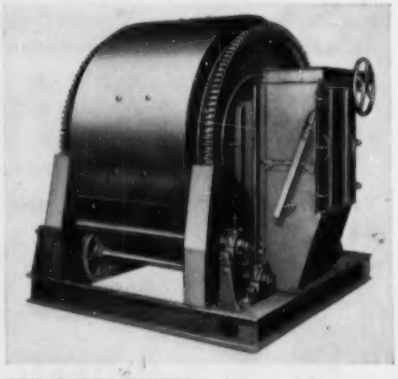


DEN AND EXCAVATOR — speeds processing of superphosphates. Easily operated by two men . . . produces 16 to 40 tons per batch and up to 480 tons per day of superior fertilizer free from lumps. *Continuous Dens also available.*

Ever since 1881, the Sturtevant Mill Company has specialized in designing and supervising the construction of complete fertilizer plants, as well as manufacturing fertilizer equipment from individual machines for specific applications to complete processes.

The experience gained through 71 years of intimate association with the fertilizer industry and its problems gives Sturtevant the expert "know-how" in fertilizer plant design that can save you time and money.

Whether you plan to build a new plant, modernize or buy new equipment, it will pay you to consult Sturtevant Mill. Our engineers, specialists in fertilizer manufacture, are available for consultation. Ask for their services, today. You will keep ahead with Sturtevant.



DRY BATCH MIXERS — 4-way mixing action mixes two or more ingredients into an inseparable, homogeneous mass. Open door accessibility makes cleaning easy. Capacities ¼ ton to 2 tons.

STURTEVANT MILL COMPANY

111 CLAYTON STREET, BOSTON 22, MASSACHUSETTS

Designers of Complete Plants and Manufacturers of:

CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS
MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

CSC

ANHYDROUS AMMONIA
82.3% N

The most economical and concentrated source of nitrogen available as a plant food. As a fertilizer it is applied directly to the soil and through irrigation. It is widely used by the fertilizer manufacturer for ammoniating superphosphates and as a basic source of N in combined plant-food forms.

AQUA AMMONIA

Convenient form of nitrogen for high-analysis formulations and acid oxidation. Nitrogen content approx. 20% in most widely used grade. Various concentrations available to suit your special need.

NITROGEN SOLUTIONS
CSC 101 – 40.6% N
CSC 102 – 40.8% N
CSC 103 – 37.0% N

Nitrogen solutions provide the lowest cost and most efficient media for quick curing of superphosphates. They supply more total N than any other ammoniating media. CSC Nitrogen Solutions offer the fertilizer manufacturer a wide range of physical properties to meet all requirements.

CSC AMMONIUM NITRATE FERTILIZER 33.5% N

New, crystalline form made by CSC's exclusive process. New process assures low moisture, free flow, and excellent handling and storage characteristics. CSC Ammonium Nitrate Fertilizer is going to the farmer through leading fertilizer manufacturers.

AGRICULTURAL CHEMICALS

COMMERCIAL SOLVENTS CORPORATION

260 Madison Ave. New York 16, N. Y.

built by Blaw-Knox

A view of the TVA granular-process fertilizer plant built by Blaw-Knox Company, Chemical Plants Division, for the Illinois Farm Supply Company.

The new Illinois Farm Supply fertilizer plant is now in operation

Designed, engineered and constructed by Blaw-Knox, the *new* TVA granular-process fertilizer plant of the Illinois Farm Supply Company at Tuscola, Illinois, is the latest productive addition to the growing fertilizer industry. It is a modern, up-to-date and highly efficient plant, fully equipped with every facility for processing, storage, bagging, and shipping, designed for fast and economical production of top quality granular fertilizer.

Blaw-Knox has long been active in the fertilizer industry, designing and erecting facilities of various capacities, producing many types of fertilizer products. Our engineers have the experience and the technical "know-how" to help you plan and construct your fertilizer plant. We shall be glad to discuss all details of your project, including the process in which you are interested, plant layout, the equipment required, and other facilities needed for maximum efficiency and economy of operation and maintenance. Why not write us today?

Blaw-Knox Engineers are specialists in the design and construction of process plants of every description. We can furnish a *complete* fertilizer plant of any desired capacity or convert existing units into more modern and profitable operations. We welcome the opportunity to submit our recommendations.

BLAW-KNOX COMPANY
Chemical Plants Division
Pittsburgh 22, Pennsylvania/Chicago 1, Illinois/Tulsa 1, Oklahoma

Teach your Shipping Sacks to TALK!

. . . TO BROADCAST the name and merits of your product thousands upon thousands of times . . . north, east, south and west . . . wherever, whenever you ship!

Your Multiwall Shipping Sacks offer you one of the most effective, most far-reaching mediums of advertising *and at no additional cost!*

Let us give them . . . through the understanding cooperation of our artists and through our exclusive Kolorseal process of printing . . . an impressive copy design in clean, brilliant colors . . . a design which is *bound* to attract the attention and create the interest of prospective customers throughout your trading area.

Don't miss this opportunity! . . . Send for samples . . . Preferably, call in the Raymond man. . . . Not the slightest obligation!

THE RAYMOND BAG COMPANY
Middletown, Ohio
Phone 2-5461

Raymond

MULTIWALL PAPER SHIPPING SACKS

NATIONAL PLANT FOOD INSTITUTE

PRELIMINARY CONVENTION — JUNE 12 - 15
THE GREENBRIER—WHITE SULPHUR SPRINGS WEST VIRGINIA

Sunday, June 12

12:00 noon-9:00 p.m.—Registration, Foyer

Monday, June 13

8:30 a.m.-6:00 p.m.—Registration, Foyer

9:30 a.m.—Meeting of the National Plant Food Institute Board of Directors-elect (meeting as a committee), West Virginia Room

Combined meeting, APFC's Agronomy Advisory and NFA's Plant Food Research Committees

Business Meetings

Forum: Problems Relating to Fertilizer-Pesticide Mixtures, Fillmore and Van Buren Rooms

M. V. Bailey, Technical Director, Agricultural Chemicals Division, American Cyanamid Company; Moderator

K. D. Jacob, Head, Fertilizer and Lime Section, U.S. Department of Agriculture

C. T. Harding, General Manager, Fertilizer Division, Manufacturing Department, Virginia-Carolina Chemical Corporation

John D. Conner, Attorney, Sellers and Conner

Rodney C. Berry, Virginia State Chemist

Afternoon—Recreation Events

4:00 p.m.—Ladies' Garden Party, Old White Patio

6:30 p.m.—Hospitality Hour, Courtesy of Nitrogen Producers, Auditorium Patio

8:00 p.m.—Dinner, Main Dining Room

10:00 p.m. to 1.00 a.m.—Open House, Auditorium: Awarding of ladies' door prizes, Dancing

Tuesday, June 14

9:00 a.m.-12:00 noon—Registration

10:00 a.m.—General Session—Auditorium

E. A. Geoghegan, Chairman, Board of Directors, The National Fertilizer Association, Presiding

Invocation, **Rev. S. D. Rexrode,** Emmanuel Methodist Church

Remarks, **E. A. Geoghegan**

Remarks, **Edwin Pate,** Chairman, Executive Committee, American Plant Food Council

Youth Panel:

William B. Ward, President, American Association of Agricultural College Editors, and Head, Department of Extension Teaching and Information, Cornell University; Moderator

William D. Gunter, Jr., National President, Future Farmers of America, Live Oak, Florida

Joe Strickland and **Tommy Dodson,** representing the National Junior Vegetables Growers Association, Summersville, West Virginia

Lamar Ratliff, representing the 4-H Clubs, Baldwyn, Mississippi

Address—**Hon. E. L. Peterson,** Assistant Secretary of Agriculture, U. S. Department of Agriculture

Afternoon—Recreation Events

2:30 p.m.—Ladies' Bridge and Canasta Party, Trellis Room

6:00 p.m.—Hospitality Hour, Courtesy of Potash Producers, Auditorium Patio

7.30 P.M. to 1:00 A.M.—Annual Banquet, Auditorium: Entertainment and Dancing

Wednesday, June 15

10:00 a.m.—General Session—Auditorium: **Mr. Pate,** Presiding

Memorial Record, **George W. Gage**

Presentation—APFC Soil Builders' Awards, **Louis H. Wilson**

Address, **Hon. Harold D. Cooley** of North Carolina, Chairman of the House Committee on Agriculture

Address, **Hon. John L. McClellan** of Arkansas, Chairman of the Senate Committee on Government Operations

Unfinished Business

CONVENTION COMMITTEE

Ralph B. Douglass, E. A. Geoghegan, J. A. Howell, John A. Miller, Edwin Pate, C. T. Prindeville, Paul J. Prosser, Sr., John E. Sanford, J. E. Totman, Louis Ware.

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MEN'S GOLF COMMITTEE

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Mrs. S. L. Nevins, Chairman; Mrs. John W. Hall, Vice Chairman; Mrs. J. A. Naftel, Mrs. B. P. Redman, Mrs. John R. Taylor, Jr., Mrs. F. T. Techter.

National Plant Food Institute Convention speakers: Left, Ervin L. Peterson, Assistant Secretary of Agriculture. Right, M. V. Bailey, American Cyanamid's technical director of agricultural research.

Domestic Fertilizer Consumption

by
WALTER SCHOLL, HILDA M. WALLACE & ESTHER I. FOX

FERTILIZER AND AGRICULTURAL LIME SECTION
SOIL AND WATER CONSERVATION RESEARCH BRANCH
AGRICULTURAL RESEARCH SERVICE
U. S. DEPARTMENT OF AGRICULTURE
BELTSVILLE, MARYLAND

For the year ended June 30, 1954, the consumption of fertilizers in the United States and territories amounted to 22,773,499 tons or 2.73 percent less than the consumption in 1952-53. This quantity comprised 22,157,986 tons of products containing one or more of the primary nutrients (N, available P_2O_5, K_2O) and 615,513 tons of the secondary and trace element materials which did not contain primary nutrients. The consumption of these fertilizers was, respectively, 377,135 tons (1.67 percent) and 261,974 tons (29.86 percent) less than that in 1952-53.

Although the tonnage of fertilizers used in 1953-54 was lower than in 1952-53, a new record in total consumption of primary nutrients was set for the fifteenth consecutive year. Thus the consumption of these nutrients amounted to 5,895,558 tons, an increase of 4.42 percent (249,502 tons) over that in the preceding year. The consumption of nitrogen increased 12.85 percent (210,360 tons) to 1,847,416 tons and that of K_2O 3.90 percent (67,792 tons) to 1,806,042 tons, whereas the consumption of available P_2O_5 decreased 1.26 percent (28,650 tons) to 2,242,100 tons. The content of total P_2O_5 in all fertilizers decreased 4.28 percent (118,317 tons) to 2,646,971 tons.

The average primary nutrient content of fertilizers bearing primary nutrients was 26.61 percent in 1953-54 as compared with 25.05 percent for the preceding year.

The data presented herein were compiled from manufacturers' reports of shipments to agents, dealers, distributors, and farmers in the Territories (except Alaska), the District of Columbia, and the States except California, Florida, Massachusetts, Missouri, North Carolina, South Carolina, and Texas. For the latter seven States the data were compiled chiefly from the reports of the respective fertilizer control officials. No data were available for Alaska. Supplementary information was furnished by the control offices and other State agencies, as well as by fertilizer brokers, and special inquiries were made of all known distributors and custom applicators of anhydrous ammonia.

The quantities are reported as 2,000-pound tons. Although the data refer to shipments, the terms "consumption," "sales," and "shipments" are used synonymously. The actual consumption differs slightly, no doubt, from either the shipments or sales.

ALL FERTILIZERS

The consumption of the two classes of fertilizers, mixtures and materials, is summarized by States and regions in Table 1. The tonnage of all fertilizers consumed in each of 16 States, the District of Columbia, Hawaii, and Puerto Rico was higher than in 1952-53.

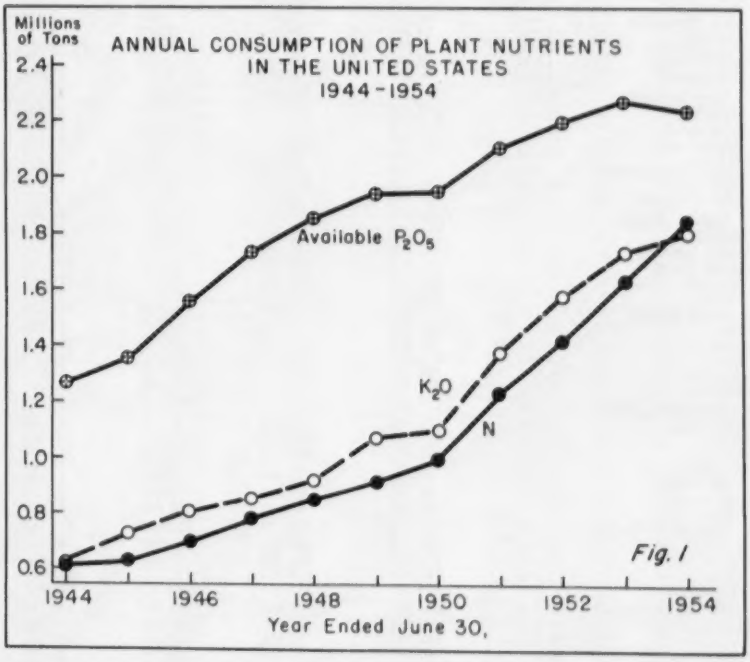

Fig. 1

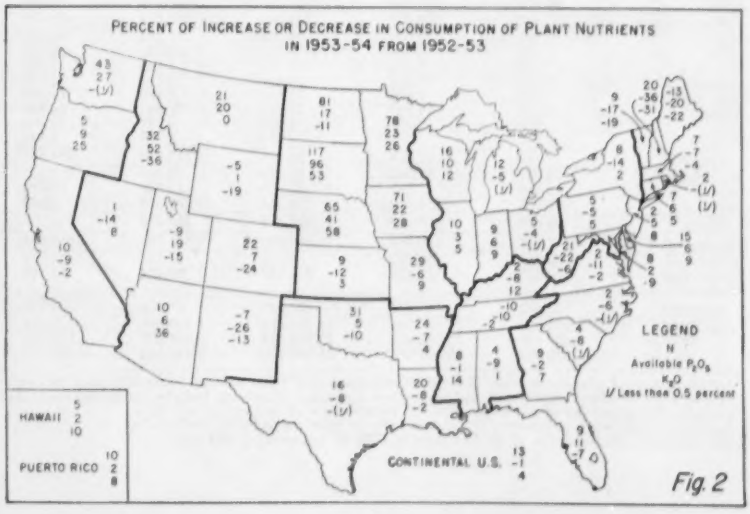
PERCENT OF INCREASE OR DECREASE IN CONSUMPTION OF PLANT NUTRIENTS IN 1953-54 FROM 1952-53
LEGEND
N
Available P_2O_5
K_2O
// Less than 0.5 percent
HAWAII 5 2 10
PUERTO RICO 10 2 8
CONTINENTAL U.S. 13 -1 4

Fig. 2

Based on the tonnages for each six month period of 1952-53, most of the decrease in total consumption of all fertilizers in 1953-54 occurred in the July-December period. Consumption for this period in 1953-54 was 781,930 tons (11.57 percent) below that for the corresponding period of 1952-53, while for the January-June period consumption was 142,821 tons (0.86 percent) above the quantity for the same period of 1952-53. During the fall period, there was a decrease of 317,338 tons of mixtures and 464,592 tons of materials, while in the spring period the consumption was higher by 136,190 tons of mixtures and 6,631 tons of materials.

Regional distribution of the consumption of all fertilizers in 1952-53 and 1953-54, as percentages of the country totals, is shown in Table 1a.

Table 1a.—Regional Percentage Distribution of Consumption of All Fertilizers

Region	1952-53	1953-54
New England	2.01	1.83
Middle Atlantic	9.05	9.08
South Atlantic	26.79	26.97
East North Central	21.79	21.18
West North Central	8.95	9.77
East South Central	13.62	13.28
West South Central	5.99	6.12
Mountain	1.55	1.73
Pacific	8.64	8.23
Territories	1.61	1.81
United States	100.00	100.00

In Table 1, the percentage change in consumption of fertilizers in 1953-54 as compared with 1952-53 is based on the tonnage of primary nutrient fertilizers only, in order that a direct comparison may be made with the percentage change in consumption of the primary nutrients themselves.

MIXTURES

Mixed fertilizers consumed in the United States and Territories amounted to 15,541,076 tons, as compared with 15,722,224 tons in 1952-53. The quantity of mixtures consumed in 1953-54 was 68.24 percent of the total fertilizer tonnage, as compared with an average of 67.46 percent for the preceding five-year period. In

Table 1.—Consumption of Fertilizers, Year Ended June 30, 1954[1]

State & Region	Mixtures			Materials[2]			All Fertilizers 1953-54	Relative Consumption 1952-53 = 100	
	July 1—Dec. 31, 1953	Jan 1—June 30, 1954	Total	July 1—Dec. 31, 1953	Jan. 1—June 30, 1954	Total		Fertilizers[3]	Total N, Avail. P_2O_5 & K_2O
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Percent	Percent
Maine	17,703	147,047	164,750	2,516	4,516	7,032	171,782	81	81
New Hampshire	1,444	10,381	11,825	861	3,126	3,987	15,812	74	74
Vermont	3,130	24,434	27,564	5,899	4,978	10,877	38,441	77	85
Massachusetts	10,120	58,996	69,116	4,330	11,572	15,902	85,018	100	98
Rhode Island	1,839	11,616	13,455	633	1,378	2,011	15,466	100	100
Connecticut	6,395	58,808	65,203	3,525	21,508	25,033	90,236	104	106
New England	40,631	311,282	351,913	17,764	47,078	64,842	416,755	89	88
New York	94,453	418,689	513,142	39,738	56,565	96,303	609,445	92	95
New Jersey	50,635	215,403	266,038	8,351	16,619	24,970	291,008	105	105
Pennsylvania	156,080	452,097	608,177	24,890	47,880	72,770	680,947	97	100
Delaware	13,409	75,364	88,773	931	5,177	6,108	94,881	105	109
District of Columbia	565	1,342	1,907	458	333	791	2,698	104	105
Maryland	73,604	218,421	292,025	5,800	14,718	20,518	312,543	103	106
West Virginia	13,191	54,660	67,851	3,722	5,610	9,332	77,183	88	89
Middle Atlantic	401,937	1,435,976	1,837,913	83,890	146,902	230,792	2,068,705	98	100
Virginia	147,453	537,648	685,101	22,296	91,666	113,962	799,063	94	95
North Carolina	218,046	1,272,600	1,490,646	46,390	312,163	358,553	1,849,199	98	98
South Carolina	100,945	571,078	672,023	41,709	227,389	269,098	941,121	96	98
Georgia	158,151	944,555	1,102,706	50,260	216,068	266,328	1,369,034	98	104
Florida	415,334	656,196	1,071,530	46,113	67,038	113,151	1,184,681	103	104
South Atlantic	1,039,929	3,982,077	5,022,006	206,768	914,324	1,121,092	6,143,098	98	100
Ohio	308,914	709,228	1,018,142	24,150	51,876	76,026	1,094,168	93	99
Indiana	235,604	788,496	1,024,100	49,755	106,873	156,628	1,180,728	98	108
Illinois	169,980	461,540	631,520	411,552	463,075	874,627	1,506,147	91	105
Michigan	156,891	388,340	545,231	17,812	37,349	55,161	600,392	93	99
Wisconsin	70,210	331,931	402,141	10,498	28,564	39,062	441,203	105	112
East North Central	941,599	2,679,535	3,621,134	513,767	687,737	1,201,504	4,822,638	95	104
Minnesota	48,285	203,259	251,544	20,145	51,086	71,231	322,775	121	132
Iowa	86,053	334,811	420,864	80,873	150,421	231,294	652,158	118	136
Missouri	141,683	327,052	468,735	114,778	173,107	287,885	756,620	91	108
North Dakota	6,419	16,639	23,058	9,952	14,667	24,619	47,677	118	121
South Dakota	2,299	11,100	13,399	4,676	11,932	16,608	30,007	180	202
Nebraska	12,790	53,156	65,946	41,897	91,273	133,170	199,116	136	157
Kansas	53,723	45,847	99,570	63,640	52,679	116,319	215,889	90	95
West North Central	351,252	991,864	1,343,116	335,961	545,165	881,126	2,224,242	106	123
Kentucky	53,979	398,794	452,773	35,289	93,521	128,810	581,583	95	100
Tennessee	70,133	324,999	395,132	40,502	88,460	128,962	524,094	90	92
Alabama	91,584	745,949	837,533	113,722	232,239	345,961	1,183,494	94	98
Mississippi	19,889	334,519	354,408	140,371	239,949	380,320	734,728	100	107
East South Central	235,585	1,804,261	2,039,846	329,884	654,169	984,053	3,023,899	95	100
Arkansas	18,966	174,831	193,797	35,592	141,288	176,880	370,677	101	109
Louisiana	28,581	144,781	173,362	44,324	100,480	144,804	318,166	100	106
Oklahoma	24,323	40,191	64,514	50,148	30,328	80,476	144,990	99	109
Texas	60,663	220,724	281,387	125,808	153,800	279,608	560,995	99	102
West South Central	132,533	580,527	713,060	255,872	425,896	681,768	1,394,828	100	106
Montana	1,103	3,131	4,234	11,894	12,974	24,868	29,102	112	120
Idaho	72	6,714	6,786	30,756	52,452	83,208	89,994	122	141
Wyoming	55	2,324	2,379	2,965	5,888	8,853	11,232	88	99
Colorado	3,224	11,466	14,690	10,146	22,938	33,084	47,774	97	110
New Mexico	172	1,975	2,147	5,570	14,645	20,215	22,362	81	82
Arizona	5,519	15,943	21,462	38,843	94,896	133,739	155,201	112	109
Utah	270	3,351	3,621	9,427	15,369	24,796	28,417	89	102
Nevada	201	672	873	2,737	5,545	8,282	9,155	94	93
Mountain	10,616	45,576	56,192	112,338	224,707	337,045	393,237	106	112
Washington	5,777	23,853	29,630	58,469	113,172	171,641	201,271	131	134
Oregon	4,519	17,460	21,979	45,347	80,074	125,421	147,400	99	107
California	83,168	138,096	221,264	581,660	723,042	1,304,702	1,525,966	108	103
Pacific	93,464	179,409	272,873	685,476	916,288	1,601,764	1,874,637	109	108
Continental U. S.	3,247,546	12,010,507	15,258,053	2,541,720	4,562 266	7,103,986	22,362,039	98	104
Hawaii	30,237	28,927	59,164	36,245	44,639	80,884	140,048	108	106
Puerto Rico	92,239	131,620	223,859	25,434	22,119	47,553	271,412	110	108
Alaska[4]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Territories	122,476	160.547	283,023	61,679	66.758	128,437	411,460	109	107
Total: 1953-54	3,370.022	12.171.054	15,541.076	2,603.399	4,629.024	7,232.423	22,773.499	98	104
1952-53	3,687,360	12,034.864	15,722,224	3,067,991	4,622,393	7,690,384	23,412,608	100	100
1951-52	3,533,404	11,552,945	15,086,349	2,856,938	4,489,111	7,346,069	22,432,418	96	92

[1] Includes: Ground phosphate rock, basic slag, secondary and trace element materials, such as, borax, sulfur, manganese sulfate, etc., used as separate materials, also fertilizers distributed by government agencies. Does not include liming materials, but includes gypsum.
[2] Excludes the quantities of materials used for manufacture of commercial mixtures.
[3] Fertilizers which were guaranteed to contain primary plant nutrients (N, P_2O_5, K_2O).
[4] Not available: Consumption of all fertilizers in 1952-53 amounted to 653 tons.

1953-54, 1,319 grades were reported by their guaranteed analyses. It is estimated that additional grades approximating 500 in number were reported under unspecified designations.

Consumption of individual grades of mixtures in total quantities of 2,500 tons or more in the continental United States is shown in Table 2. In 1953-54, there were 176 of these grades totaling 14,853,606 tons and accounting for 97.35 percent of the total quantity of mixtures consumed. Other reported grades numbered 1,044 and totaled 280,907 tons, and approximately 500 grades reported under unspecified designations totaled 123,540 tons.

Consumption of mixed fertilizers in Hawaii and Puerto Rico totaled 283,023 tons in 141 grades (all specified). While most of the grades in Puerto Rico are similar to those used on the Continent, many of those in Hawaii are designated in fractional numbers.

The tonnages of the ten grades most favored in the continental United States are shown in Table 2a. See page 39.

The total tonnage of these goods accounted for 50 percent or more of the total tonnage of mixtures consumed in the continental United States in both 1952-53 and 1953-54. Grades 3-12-12, 5-10-10, and 5-10-5 were the only ones of this group that retained the same relative position in both years. Grade 3-9-6 ranked fourth in 1952-53 but dropped to sixth place in 1953-54, being exceeded in tonnage by grades 10-10-10 and 4-16-16.

The tonnages of the 15 principal grades consumed in each of the continental regions and Puerto Rico in 1953-54 are shown in Table 3, together with the tonnages of these grades for each State in the region. The total tonnage of these 15 grades represents 55 percent or more of the consumption of mixtures in each of the regions.

Among the individual States, the total number of specified grades ranged from 16 for Nevada to 782 for Florida. For California, the number originally reported was 599, but subsequent information from the State fertilizer control office indicates over 800; some 200 grades were originally included in the unspecified group.

The consumption of mixtures by classes (N-P-K, N-P, P-K, N-K) for each region and the United States is shown in Table 5. Except for the Mountain region, N-P-K mixtures

Table 2.—Consumption of Principal Mixed Fertilizers in the Continental United States, By Grades, Years Ended June 30, 1953 and 1954

Grade	Consumption		Proportion of Total	
	1952-53[1]	1953-54	1952-53	1953-54
	Tons	Tons	Percent	Percent
0-8-24	4,026	5,468	0.03	0.04
0-9-27	26,497	15,510	.17	.10
0-10-10	3,194	4,367	.02	.03
0-10-20	62,993	49,130	.41	.32
0-10-30	35,324	45,006	.23	.30
0-10-45	2,795	3,769	.02	.02
0-12-12	123,881	66,343	.80	.43
0-12-16	3,260	2,765	.02	.02
0-12-20	26,478	20,121	.17	.13
0-12-24	2,017	2,976	.01	.02
0-12-36	6,076	8,554	.04	.06
0-14-5	3,852	4,611	.03	.03
0-14-7	76,332	32,590	.49	.21
0-14-10	25,786	8,200	.17	.05
0-14-14	266,386	177,499	1.72	1.16
0-15-15	31,858	11,632	.21	.08
0-15-30	12,876	17,998	.08	.12
0-16-8	9,208	12,881	.06	.08
0-20-10	28,770	22,905	.19	.15
0-20-20	305,125	343,162	1.97	2.25
0-30-15	3,528	5,525	.02	.04
0-30-30	6,532	11,055	.04	.07
2-10-8	7,797	8,044	.05	.05
2-12-6	156,447	81,034	1.01	.53
2-12-12	409,203	404,036	2.65	2.65
3-8-5	6,442	4,302	.04	.03
3-8-8	16,866	12,743	.11	.08
3-9-6	671,216	608,256	4.34	3.99
3-9-9	455,699	489,239	2.95	3.21
3-9-12	38,079	28,981	.25	.19
3-9-15	7,081	9,308	.05	.06
3-9-18	154,665	113,702	1.00	.75
3-9-27	118,009	123,964	.76	.81
3-10-8	5,098	2,693	.03	.02
3-10-12	7,787	6,209	.05	.04
3-12-6	478,876	278,396	3.10	1.82
3-12-8	1,262	3,990	.01	.03
3-12-12	2,241,137	1,730,944	14.50	11.34
3-18-9	114,515	72,765	.74	.48
4-6-5	6,126	6,201	.04	.04
4-6-6	17,290	15,583	.11	.10
4-6-8	51,267	48,399	.33	.32
4-7-5	130,603	130,530	.85	.86
4-8-4	13,736	13,987	.09	.09
4-8-6	481,175	320,689	3.11	2.10
4-8-8	330,422	393,334	2.14	2.58
4-8-10	63,485	87,500	.41	.57
4-8-12	78,761	51,841	.51	.34
4-9-3	77,400	76,442	.50	.50
4-10-6	581,802	498,719	3.76	3.27
4-10-7	527,094	552,416	3.41	3.62
4-10-8	5,810	6,334	.04	.04
4-10-10	9,636	9,513	.06	.06
4-12-4	192,110	142,517	1.24	.93
4-12-6	7,346	2,883	.05	.02
4-12-8	160,948	152,806	1.04	1.00
4-12-12	204,660	370,014	1.32	2.43
4-12-16	3,110	2,651	.02	.02
4-12-24	1,735	3,110	.01	.02
4-16-0	25,882	11,996	.17	.08
4-16-8	71,295	52,456	.46	.34
4-16-16	473,321	698,177	3.06	4.58
4-24-12	81,371	55,070	.53	.36
5-3-6	2,803	3,640	.02	.02
5-5-5	1,694	2,564	.01	.02
5-5-8	7,661	8,208	.05	.05
5-5-10	1,246	2,538	.01	.02
5-6-6	1,487	2,702	.01	.02
5-6-8	7,782	7,363	.05	.05
5-7-5	25,977	24,068	.17	.16
5-7-10	5,141	3,725	.03	.02
5-8-7	19,922	16,840	.13	.11
5-8-8	4,632	4,630	.03	.03
5-10-5	877,240	821,116	5.68	5.38
5-10-10	1,115,741	1,287,746	7.22	8.44
5-10-15	33,221	89,404	.22	.59
5-10-16	16,318	5,933	.11	.04
5-10-20	3,789	7,819	.02	.05
5-15-10	22,831	10,040	.15	.07
5-15-15	4,084	17,319	.03	.11
5-15-30	4,023	4,747	.03	.03
5-20-10	17,117	44,710	.11	.29
5-20-20	87,676	300,809	.57	1.97
6-3-6	22,467	26,182	.15	.17
6-4-6	8,053	11,047	.05	.07
6-4-8	14,588	21,204	.09	.14
6-6-6	79,328	81,097	.52	.53
6-6-8	16,968	14,169	.07	.09
6-6-12	5,283	11,669	.03	.08
6-6-18	9,729	11,874	.06	.08
6-7-7	8,224	5,672	.05	.04
6-8-2	2,276	3,929	.01	.03
6-8-4	215,173	168,852	1.39	1.11
6-8-6	239,370	195,320	1.55	1.28
6-8-8	274,168	288,134	1.77	1.89
6-8-12	42,704	40,244	.28	.26
6-8-16	2,582	2,746	.02	.02
6-9-3	6,666	5,534	.04	.04
6-9-6	13,839	11,053	.09	.07
6-9-9	8,177	8,271	.05	.05
6-9-12	70,840	54,609	.46	.36
6-9-27	2,308	3,035	.02	.02
6-10-4	59,792	57,216	.39	.37
6-12-4	3,643	3,383	.02	.02
6-12-6	53,609	51,806	.35	.34
6-12-12	166,226	185,274	1.08	1.21
6-12-18	3,976	4,223	.03	.03
6-20-20	2,348	4,533	.02	.03
6-24-0	30,626	21,535	.20	.14
6-24-12	22,506	43,087	.15	.28
6-24-24	6,316	13,356	.04	.09
7-0-11	0	5,037	.00	.03
7-5-7	2,578	2,690	.02	.02
7-5-9	0	3,418	.00	.02
7-7-7	38,202	36,428	.25	.24
7-7-10	61	4,199	(2)	.03
7-8-8	1,166	3,183	.01	.02
7-9-9	3,911	2,546	.03	.02
8-0-8	13,061	16,084	.08	.11
8-0-12	10,127	6,625	.07	.04
8-0-24	18,541	20,088	.12	.13
8-4-4	2,978	2,666	.02	.02
8-4-8	11,439	37,279	.07	.24
8-6-4	4,138	5,443	.03	.04
8-6-6	4,931	3,339	.03	.02
8-6-8	7,722	7,545	.05	.05
8-8-4	21,050	20,037	.14	.13
8-8-8	342,242	254,471	2.21	1.67
8-9-10	4,697	5,876	.03	.04
8-10-12	13,851	11,742	.09	.08
8-12-12	15,747	27,833	.10	.18
8-12-16	34,869	17,021	.23	.11
8-16-8	7,853	7,062	.05	.05
8-16-16	67,434	94,752	.44	.62
8-24-8	106,141	101,509	.69	.66
8-24-12	769	6,583	(2)	.04
8-32-0	53,376	72,178	.35	.47
9-6-6	5,632	6,921	.04	.05
9-9-18	2,303	3,803	.01	.02
9-18-9	4,056	4,760	.03	.03
9-36-0	1,236	2,522	.01	.02
10-0-10	34,396	44,797	.22	.29
10-0-12	1,953	2,539	.01	.02
10-4-10	3,613	5,687	.02	.04
10-5-5	3,151	2,559	.02	.02
10-6-4	38,474	35,258	.25	.23
10-10-0	18,387	8,007	.12	.05
10-10-5	37,659	30,971	.24	.20
10-10-10	401,079	701,365	2.60	4.60
10-12-10	4,418	3,840	.03	.03
10-15-15	5,857	2,893	.04	.02
10-16-8	10,468	9,948	.07	.07
10-20-0	121,300	117,049	.78	.77
10-20-10	23,235	48,714	.15	.32
10-20-20	2,900	9,088	.02	.06
10-30-10	6,391	3,624	.04	.02
12-0-10	12,584	14,146	.08	.09
12-0-12	10,307	5,148	.07	.03
12-6-6	4,449	3,583	.03	.02
12-8-8	2,820	3,837	.02	.03
12-12-6	3,289	3,758	.02	.02
12-12-12	73,072	208,922	.47	1.37
12-24-0	8,880	11,743	.06	.08
12-24-12	36,891	31,354	.24	.21
13-13-13	15,786	24,136	.10	.16
14-0-14	30,509	38,892	.20	.25
14-14-0	5,008	8,286	.03	.05
14-14-14	0	2,852	.00	.02
15-0-12	3,078	4,437	.02	.03
15-8-4	14,433	8,451	.09	.06
15-15-0	32,404	58,402	.21	.38
16-0-6	2,764	2,574	.02	.02
16-10-0	0	6,558	.00	.04
17-7-0	32,307	19,706	.21	.13
19-19-0	0	3,560	.00	.02
20-0-20	1,139	4,447	.01	.03
176 Grades	15,008,790	14,853,606	97.12	97.35
Other specified grades[3]	316,499	280,907	2.05	1.84
Grades not shown[4]	128,663	123,540	.83	.81
Total[5]	15,453,952	15,258,053	100.00	100.00

[1] The tonnages of 48 grades were increased by amounts originally reported as "other specified grades." Their combined amount of increase was 12,194 tons.

[2] Less than 0.01 percent.

[3] There were approximately 1,149 in 1952-53 and 1,044 in 1953-54.

[4] There were, at least, 500 grades not shown by their guaranteed analysis.

[5] Does not include the quantity of mixtures consumed in the Territories.

Table 3.—Consumption of Mixed Fertilizers, by Grades in Each State and Region, Year Ended June 30, 1954[1]

State	Fifteen Principal Grades Consumed in Regions Tons														All Other Grades		Total Tons
															Number[2]	Tons	
New England																	
	5-10-10	6-9-12	8-12-12	6-3-6	8-16-16	8-12-16	5-8-7	7-7-7	10-10-10	0-15-30	5-10-5	6-9-9	8-9-10	0-14-14	6-8-8			
Maine	21,046	53,990	24,818	.....	6,263	16,824	3,517	2,953	2,921	55	367	8,260	5,876	3,302	.....	43	14,558	164,750
New Hampshire	3,838	.....	253	.....	1,881	14	914	889	913	841	141	.....	.....	185	.....	24	1,956	11,825
Vermont	6,973	.....	81	.....	5,067	36	260	800	1,979	8,212	350	.....	.....	323	6	39	3,477	27,564
Massachusetts	17,015	.....	.....	8,718	4,002	77	6,986	5,999	4,099	421	5,304	.....	.....	790	1,208	27	14,497	69,116
Rhode Island	6,573	.....	575	.....	193	4	955	839	279	87	754	.....	.....	109	163	31	2,924	13,455
Connecticut	10,644	.....	1,060	16,704	2,179	64	4,184	3,189	2,452	1,828	3,886	.....	.....	925	4,050	51	14,038	65,203
Total	66,089	53,990	26,787	25,422	19,585	17,019	16,816	14,669	12,643	11,444	10,802	8,260	5,876	5,634	5,427	106	51,450	351,913
Middle Atlantic																	
	5-10-10	3-12-6	5-10-5	10-10-10	0-20-20	6-12-6	8-16-16	0-14-14	4-8-12	2-12-12	4-12-12	8-8-8	6-12-12	7-7-7	4-12-8			
New York	160,164	20,067	139,082	53,664	13,276	39,840	14,801	3,051	.....	80	15	4,998	13,916	9,935	268	66	39,985	513,142
New Jersey	151,211	3,149	30,007	7,172	3,268	511	1,068	4,308	481	106	43	13,687	1,733	8,452	5,290	56	35,552	266,038
Pennsylvania	241,806	130,397	31,606	42,876	25,276	2,094	15,311	11,809	9,890	7,871	23,210	2,495	5,242	554	5,559	102	52,181	608,177
Delaware	44,065	3,732	2,483	4,894	1,832	.....	4,237	3,499	3,117	4,282	1,283	434	1,368	267	873	51	12,407	88,773
District of Columbia	42	76	802	4	.....	.....	.....	.....	204	12	.....	.....	2	14	7	16	744	1,907
Maryland	82,056	65,717	28,225	12,015	3,991	.....	2,343	9,531	19,194	16,070	3,874	3,034	1,851	1,956	4,029	68	38,139	292,025
West Virginia	21,766	16,937	4,348	2,598	4,087	.....	237	2,818	.....	1,710	99	10	535	2	4,488	38	8,216	67,851
Total	701,110	240,075	236,553	123,223	51,730	42,445	37,997	35,016	32,886	30,131	28,524	24,658	24,647	21,180	20,514	180	187,224	1,837,913
South Atlantic																	
	4-10-6	3-9-6	3-9-9	2-12-12	4-8-8	4-8-6	4-12-12	5-10-10	5-10-5	4-7-5	6-8-6	4-8-10	3-12-12	6-6-6	4-9-3			
Virginia	68	67,811	34,914	191,530	.....	.....	25	103,128	76,003	.....	14,673	4,777	10	.....	4,903	45	187,259	685,101
North Carolina	323,195	350,440	158,704	142,960	295	.....	10	148,818	46,542	.....	63,288	72,013	32	.....	50,626	41	133,723	1,490,646
South Carolina	174,383	60,192	202,167	.....	36,487	.....	12,101	12,918	50,260	.....	5,872	.....	81,711	.....	.....	28	35,932	672,023
Georgia	433	9,373	86,258	30,992	230,458	278,598	289,638	10,650	6,245	1	39,305	.....	2,798	42	8,836	115	109,079	1,102,706
Florida	617	35	5,600	2,825	90,656	41,932	7,183	4,694	6,387	130,529	6,199	10,669	2,297	80,387	12,077	767	669,443	1,071,530
Total	498,696	487,851	487,643	368,307	357,896	320,530	308,957	280,208	185,437	130,530	129,337	87,459	86,848	80,429	76,442	931	1,135,436	5,022,006
East North Central																	
	3-12-12	4-16-16	10-10-10	0-20-20	5-20-20	5-10-10	3-9-27	12-12-12	3-18-9	3-9-18	0-10-30	6-12-12	2-12-6	10-6-4	8-8-8			
Ohio	533,443	44,623	76,011	42,262	47,268	137,718	156	14,110	18,467	9,292	781	9,113	15,471	7,891	1,095	66	60,441	1,018,142
Indiana	362,033	265,936	140,088	59,212	45,438	13,421	31,959	16,355	10,622	14,278	13,155	3,916	3,615	1,251	5,279	60	37,542	1,024,100
Illinois	151,702	132,794	116,107	33,653	23,429	311	49,931	36,886	3,224	12,431	4,649	10,024	313	1,102	8,002	67	46,962	631,520
Michigan	226,244	112,912	34,670	25,702	26,903	12,234	2,339	18,777	36,877	10,814	3,769	2,974	3,355	4,855	505	57	22,301	545,231
Wisconsin	114,079	62,339	35,348	41,404	51,096	5	16,288	1,045	2,270	19,963	21,570	1,249	.....	104	93	64	35,288	402,141
Total	1,387,501	618,604	402,224	202,233	194,134	163,689	100,673	87,173	71,460	66,778	43,924	27,276	22,754	15,203	14,974	136	202,534	3,621,134
West North Central																	
	10-10-10	5-20-20	3-12-12	8-24-8	10-20-0	12-12-12	4-16-16	8-32-0	4-12-4	0-20-20	15-15-0	8-8-8	4-24-12	5-20-10	6-24-12			
Minnesota	13,767	34,935	6,258	17	4,663	185	38,946	8,733	.....	23,578	120	5	19,005	10,147	33,848	61	57,337	251,544
Iowa	49,357	60,547	32,628	3,304	39,327	13,998	24,070	26,572	519	8,687	9,710	692	828	31,224	2,103	104	117,298	420,864
Missouri	44,632	4,364	57,933	77,110	3,598	74,661	8,827	80	50,091	21,483	2,112	48,636	18,943	.....	.....	61	56,265	468,735
North Dakota	302	158	267	24	841	35	797	10,388	.....	53	123	.....	2,052	136	3,741	35	4,141	23,058
South Dakota	152	106	17	60	6,391	35	29	1,768	4	32	2,249	.....	123	46	183	46	2,204	13,399
Nebraska	857	143	96	886	13,683	1,285	24	10,345	102	732	20,023	23	361	27	.....	43	17,359	65,946
Kansas	2,275	49	1,219	16,994	27,436	757	112	10,121	6,101	468	18,493	460	689	2	.....	38	14,394	99,570
Total	111,342	100,302	98,418	98,395	95,939	90,956	72,805	68,007	56,817	55,033	52,830	49,816	42,001	41,582	39,875	159	268,998	1,343,116
East South Central																	
	4-10-7	6-8-8	6-8-4	5-10-5	3-9-6	6-12-12	3-12-12	5-10-15	0-14-14	6-8-6	5-10-10	2-12-6	4-12-8	8-8-8	4-12-12			
Kentucky	.....	1,438	.....	4,460	29,510	5,149	66,188	68,202	2,265	55,474	28,730	45,489	41,741	10,705	586	64	92,836	452,773
Tennessee	1,428	5,582	3,633	4,410	90,633	104,944	30,035	3,031	627	1,981	18,462	5,557	8,704	8,322	3,112	70	104,671	395,132
Alabama	493,439	64,019	152,401	2,725	31	10	49	.....	54,231	1,347	4	9	5	7,880	28,600	40	32,783	837,533
Mississippi	6,091	165,490	7,411	126,052	.....	5	1,310	.....	7,801	88	9,700	.....	.....	14,050	.....	25	16,410	354,408
Total	500,958	236,529	163,445	137,647	120,174	110,108	97,582	71,233	64,924	58,890	56,896	51,055	50,450	40,957	32,298	131	246,700	2,039,846
West South Central																	
	5-10-5	8-8-8	4-12-4	3-12-12	6-8-12	10-20-10	0-14-7	12-12-12	12-24-12	3-9-18	6-8-8	13-13-13	5-10-10	10-20-0	3-9-27			
Arkansas	63,176	5,632	9,264	3,210	36,302	9,089	1,332	7,650	1,302	18,318	61	2,104	1,193	23	10,406	57	24,735	193,797
Louisiana	34,125	32,968	13,621	23,942	607	2,014	1,602	12,880	3,039	146	14,736	4,368	4,040	31	7	37	25,236	173,362
Oklahoma	26,906	881	8,347	1,051	2	6,525	588	177	2,761	1,228	.....	314	1,277	4,650	.....	30	9,807	64,514
Texas	113,058	25,198	16,251	10,906	510	11,279	20,146	2,917	13,138	62	116	6,034	5,172	6,736	.....	94	49,864	281,387
Total	237,265	64,679	47,483	39,109	37,421	28,907	23,668	23,624	20,240	19,754	14,913	12,820	11,692	11,440	10,413	158	109,642	713,060
Mountain																	
	10-20-0	12-24-0	10-10-0	6-10-4	10-10-10	15-11-0	10-16-8	10-20-5	20-10-0	6-30-0	10-18-5	14-14-7	14-7-0	10-35-0	10-12-8			
Montana	2,603	.....	.....	225	.....	.....	1	.....	.....	790	268	.....	.....	.....	.....	19	347	4,234
Idaho	635	.....	1,313	66	2	2,047	1,062	.....	18	283	237	.....	.....	.....	.....	39	1,033	6,746
Wyoming	371	460	.....	26	.....	.....	.....	.....	.....	15	94	254	.....	740	.....	13	419	2,379
Colorado	745	7,197	.....	199	618	.....	977	.....	.....	177	362	36	.....	114	809	31	3,456	14,690
New Mexico	370	.....	31	66	7	.....	.....	.....	.....	.....	.....	.....	296	.....	.....	18	1,377	2,147
Arizona	3,382	.....	4,254	.....	1,483	.....	.....	2,017	1,624	.....	.....	735	628	.....	.....	46	7,339	21,462
Utah	888	.....	113	1,493	28	14	9	.....	.....	317	62	.....	.....	.....	.....	30	692	3,621
Nevada	123	.....	.....	467	.....	.....	.....	.....	.....	.....	.....	87	.....	.....	.....	13	196	873
Total	9,117	7,657	5,711	2,547	2,138	2,061	2,049	2,017	1,642	1,582	1,073	1,112	924	854	809	124	14,859	56,152
Pacific																	
	10-10-5	17-7-0	8-8-4	6-10-4	8-10-12	10-10-10	15-8-4	10-16-8	5-10-10	6-9-6	16-10-0	4-10-10	6-20-20	10-12-10	10-20-20			
Washington	398	4	.....	4,522	.....	1,132	.....	237	5,639	.....	.....	.....	2,531	.....	2,473	84	12,494	29,630
Oregon	136	15	2	1,042	.....	538	362	7,597	1,507	.....	.....	.....	1,709	.....	1,227	54	7,844	21,979
California	27,318	19,267	18,454	6,094	10,205	8,023	7,894	65	94	6,669	5,810	5,264	11	3,772	2	584	102,322	221,264
Total	28,052	19,286	18,456	11,658	10 205	9,693	8,256	7,899	7,240	6,669	5,810	5,264	4,251	3,772	3,702	600	122,660	272,873
Territories[3]																	
	14-2-8	12-6-10	14-4-10	15-4-7	12-4-10	13-3-12	6-8-10	10-10-8	8-6-10	10-6-14	9-10-5	12-3-16	12-10-5	16-4-5	12-2-10			
Puerto Rico	32,516	23,644	22,651	21,533	17,393	16,124	14,025	12 925	9,520	5,834	5,133	5,116	4,820	4,734	3,620	25	24,251	223,859

[1] Dashes indicate quantity of grade, if used, was less than 0.5 ton.
[2] The number of mixtures shown for each State and Region is exclusive of mixtures not specified by grade, although their tonnages are included in the totals.
[3] The total consumption in Hawaii was 59,164 tons of mixed goods, comprising 101 grades, which were manufactured to consumer's specifications. Data for Alaska not available. In 1952-53, the number of mixtures reported were nine, totaling 136 tons.

were favored over all other classes. More than 73 percent of the tonnage of all mixtures consumed in each of the other regions was of this class. N-P mixtures were consumed in largest tonnage in the Mountain region. For the United States, 90.40 percent of the tonnage of all mixtures was of the N-P-K class, while for the other classes—N-P, P-K, N-K—consumption was 2.46 percent, 5.76 percent, and 1.38 percent of the total tonnage, respectively. These proportions have not changed greatly from year to year. Over the past several years, however, the proportions of the N-P and N-K classes have steadily increased; in 1949-50, they were 1.45 and 0.60 percent, respectively.

Table 2a.—Ten Principal Grades of Mixed Fertilizers Consumed in Continental United States, Years Ended June 30, 1953 and 1954.

Grade	Consumption		Proportion of Total in Continental U. S. Consumption of Mixed Fertilizers	
	1952-53	1953-54	1952-53	1953-54
	Tons	Tons	Percent	Percent
3-12-12	2,241,137	1,730,944	14.50	11.34
5-10-10	1,115,741	1,287,746	7.22	8.44
5-10- 5	877,240	821,116	5.68	5.38
10-10-10	401,079	701,365	2.60	4.60
4-16-16	473,321	698,177	3.06	4.58
3- 9- 6	671,216	608,256	4.34	3.99
4-10- 7	527,094	552,416	3.41	3.62
4-10- 6	581,802	498,719	3.76	3.27
3- 9- 9	455,699	489,239	2.95	3.21
2-12-12	409,203	404,036	2.65	2.65
Total	7,753,532	7,792,014	50.17	51.08

The national weighted average primary nutrient content of mixed fertilizers increased from 25.84 per-

Table 4.—Principal Fertilizer Materials Consumed as Such, Year Ended June 30, 1954[1]

TONS

State & Region	Chemical Nitrogen Materials					Natural Organics		Phosphate Materials				Potash Materials		Total Primary Nutrient Materials	Secondary and Trace Element Materials[2]
	Ammonium Nitrate	Ammonium Sulfate	Calcium Cyanamide	Sodium Nitrate	Other[2]	Dried Manures	Other[2]	Phosphate Rock[3]	Superphosphates Grades 22 Percent and Under	Superphosphates Grades Over 22 Percent	Other[2]	Chlorides 50 & 60 Percent Grades	Other[2]		
Maine	1,237	78	264	281	23	412	247	25	4,203	0	140	24	20	6,954	78
New Hampshire	939	28	49	125	58	165	420	34	2,007	0	67	64	20	3,976	11
Vermont	407	2	6	166	168	62	84	80	9,604	0	35	216	17	10,847	30
Massachusetts	1,144	57	205	1,195	141	1,862	5,765	319	3,809	0	778	488	0	15,763	139
Rhode Island	79	87	122	129	23	209	739	49	334	0	142	76	3	1,992	19
Connecticut	584	36	92	726	86	1,406	13,847	106	4,438	39	1,058	1,075	1,271	24,764	269
New England	4,390	288	738	2,622	499	4,116	21,102	613	24,395	39	2,220	1,943	1,331	64,296	546
New York	14,419	389	2,605	5,787	2,366	3,242	9,758	1,276	52,730	151	1,221	913	501	95,358	945
New Jersey	2,390	166	1,932	2,880	1,728	2,710	3,194	1,241	5,709	174	1,037	1,406	144	24,711	259
Pennsylvania	4,355	2,673	1,552	1,798	1,609	2,940	6,713	7,562	36,908	31	3,108	876	107	70,232	2,538
Delaware	2,124	24	246	167	1,738	135	209	106	728	80	100	296	35	5,988	120
District of Columbia	9	4	0	64	5	114	388	0	28	40	133	3	0	788	3
Maryland	1,472	114	1,256	3,662	1,762	731	579	1,677	6,239	12	465	265	1,999	20,233	285
West Virginia	766	392	9	1,757	364	399	672	465	4,292	46	79	57	1	9,299	33
Middle Atlantic	25,535	3,762	7,600	16,115	9,572	10,271	21,513	12,327	106,634	534	6,143	3,816	2,787	226,609	4,183
Virginia	5,237	124	1,440	30,300	27,581	659	1,022	3,427	9,977	301	1,145	1,605	14,681	97,499	16,463
North Carolina	15,091	346	8,873	141,248	115,469	360	1,697	1,995	17,595	89	10,044	10,360	10,624	333,791	24,762
South Carolina	24,841	679	1,529	99,154	85,780	405	798	1,512	20,247	3	8,396	19,066	3,944	266,354	2,744
Georgia	26,425	1,177	1,930	93,818	72,499	899	745	770	16,688	277	15,813	10,496	3,358	244,895	21,433
Florida	10,048	4,008	2,257	17,028	22,174	734	6,728	13,593	7,643	140	5,338	2,806	17,688	110,185	2,966
South Atlantic	81,642	6,334	16,029	381,548	323,503	3,057	10,990	21,297	72,150	810	40,736	44,333	50,295	1,052,724	68,368
Ohio	13,687	7,658	1,473	1,122	10,398	1,179	6,999	9,874	15,389	3,520	676	2,275	1,257	75,507	519
Indiana	45,910	6,511	2,415	270	27,723	1,045	1,476	27,012	17,141	5,655	590	19,972	412	156,141	487
Illinois	36,942	35,037	1,300	117	46,555	4,657	7,184	563,876	64,420	12,067	8,303	93,153	251	873,862	765
Michigan	13,070	6,498	311	664	4,314	2,973	8,570	3,507	11,761	361	595	1,193	563	54,310	851
Wisconsin	8,492	184	84	0	2,552	952	6,034	12,836	2,810	135	103	3,943	572	38,827	235
East North Central	118,200	55,858	5,583	2,173	91,542	10,806	30,263	617,105	111,521	21,738	10,267	120,536	3,055	1,198,647	2,857
Minnesota	13,249	1,046	35	6	10,744	525	3,408	5,120	10,796	17,673	6,959	1,346	0	70,907	324
Iowa	49,140	4,907	284	0	47,423	147	3,216	23,423	52,272	10,670	32,632	6,739	369	231,222	72
Missouri	44,004	9,249	20	246	33,826	990	2,331	158,644	8,387	4,940	5,023	18,811	1,279	287,750	135
North Dakota	425	70	0	0	85	0	31	40	90	14,919	8,925	14	0	24,599	20
South Dakota	3,103	403	3	7	1,835	0	104	161	1,841	4,997	4,139	13	2	16,608	0
Nebraska	40,754	4,045	0	0	47,302	1,761	909	4,953	4,498	17,052	11,182	128	0	132,584	586
Kansas	25,826	5,943	0	0	11,608	291	1,321	7,908	3,556	23,933	35,047	776	0	116,209	110
West North Central	176,501	25,663	342	259	152,823	3,714	11,320	200,249	81,440	94,184	103,907	27,827	1,650	879,879	1,247
Kentucky	29,705	1,272	1,659	2,221	3,956	320	219	8,133	46,655	4,200	12,133	8,916	9,315	128,704	106
Tennessee	37,049	370	1,054	18,745	9,318	752	751	624	20,098	6,303	18,036	10,369	5,101	128,570	392
Alabama	52,602	1,280	834	98,370	46,660	467	200	3,415	39,631	437	89,930	10,956	130	344,912	1,049
Mississippi	113,997	6,630	11,545	60,283	58,335	19	0	6,783	37,938	1,473	60,553	22,531	208	380,295	25
East South Central	233,353	9,552	15,092	179,619	118,269	1,558	1,170	18,955	144,322	12,413	180,652	52,772	14,754	982,481	1,572
Arkansas	39,150	10,859	12,055	32,086	23,545	49	0	2,580	16,609	4,570	3,209	31,179	983	176,874	6
Louisiana	28,483	11,229	1,061	34,144	28,464	156	413	3,230	16,063	1,406	12,829	6,739	75	144,292	512
Oklahoma	11,589	2,471	0	413	2,029	701	449	14,106	32,446	6,319	8,359	1,474	20	80,376	100
Texas	33,532	40,673	1,925	2,575	29,834	2,229	3,351	18,246	74,868	17,827	50,633	1,269	21	276,983	2,625
West South Central	112,754	65,232	15,041	69,218	83,872	3,135	4,213	38,162	139,986	30,122	75,030	40,661	1,099	678,525	3,243
Montana	5,260	2,735	0	0	0	20	0	0	10	13,354	2,795	10	0	24,184	684
Idaho	13,754	19,227	572	0	1,677	68	30	0	12,664	18,475	11,116	85	2	77,670	5,538
Wyoming	1,069	457	0	0	399	1	44	0	315	4,754	741	0	0	7,772	1,081
Colorado	5,493	2,158	0	0	3,775	426	661	200	1,653	14,043	3,141	170	65	31,785	1,299
New Mexico	1,466	706	0	1	3,473	33	692	0	4,891	4,938	4,010	0	0	20,200	15
Arizona	13,490	25,037	678	969	36,915	1,539	623	40	4,868	4,110	23,935	36	658	112,898	20,841
Utah	4,487	8,085	0	0	1,076	207	221	0	4,031	4,854	1,484	38	0	24,483	313
Nevada	148	405	0	12	286	29	106	0	154	544	854	3	0	2,541	5,741
Mountain	45,167	58,810	1,250	982	47,591	2,325	2,367	240	28,586	65,072	48,076	342	725	301,533	35,512
Washington	32,557	32,334	319	204	21,220	452	2,121	850	8,595	7,678	16,377	2,431	134	125,272	46,369
Oregon	23,558	34,760	698	0	10,066	425	671	290	11,774	2,856	22,125	1,436	74	110,723	14,698
California	71,079	172,230	5,521	243	187,283	220,000[4]	54,399	1,604	51,948	11,615	86,393	1,300	4,259	867,874	436,828
Pacific	127,194	241,324	6,538	447	218,569	220,877	57,191	2,734	72,317	22,149	124,895	5,167	4,467	1,103,869	497,895
Continental U. S.	924,736	466,823	68,213	652,983	1,046,240	259,859	160,129	911,682	781,351	247,061	591,926	297,397	80,163	6,488,563	615,423
Hawaii	0	30,528	0	122	24,533	9	70	994	5,226	40	5,474	12,178	1,620	80,794	90
Puerto Rico	0	39,365	0	0	6,860	0	1	0	350	41	741	160	35	47,553	0
Alaska[5]															
Territories	0	69,893	0	122	31,393	9	71	994	5,576	81	6,215	12,338	1,655	128,347	90
Totals: 1953-54	924,736	536,716	68,213	653,105	1,077,633	259,868	160,200	912,676	786,927	247,142	598,141	309,735	81,818	6,616,910	615,513
1952-53	846,252	534,749	82,219	647,483	876,596	207,127	151,910	1,176,962	1,046,827	248,850	636,996	282,465	74,461	6,812,897	877,487
1951-52	799,189	486,817	42,254	681,761	572,903	198,726	145,089	1,160,020	1,224,290	225,059	704,787	246,576	73,548	6,561,019	785,050

[1] Includes materials distributed by Government agencies. Excludes lime and materials used by manufacturers in the formulation of commercial mixture.
[2] The principal commodities are shown in Table 5, by regions.
[3] Includes colloidal phosphate, the quantity of which is shown separately, by regions, in Table 5.
[4] Estimated.
[5] Not available.

Table 5.—Kinds of Fertilizers Consumed in Regions of the United States, in Tons, During Year Ended June 30, 1954[1]

Kinds	New England	Middle Atlantic	South Atlantic	East North Central	West North Central	East South Central	West South Central	Mountain	Pacific	Territories [2]	Total
MIXTURES: N-P-K	326,587	1,733,122	4,631,903	3,315,152	990,949	1,895,358	645,286	21,244	228,950	261,098	14,049,649
N-P	94	92	1,989	2,442	271,241	72	29,092	34,848	39,795	3,317	382,982
P-K	25,232	104,655	194,184	302,825	80,824	143,935	38,503	79	2,182	2,393	894,814
N-K	0	44	193,930	715	102	481	177	21	1,946	16,215	213,631
CHEMICAL NITROGEN MATERIALS											
Ammonia, anhydrous	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]	350,474
Ammonium nitrate	4,390	25,535	81,642	118,200	176,501	233,353	112,754	45,147	127,194	0	924,716
Ammonium nitrate-limestone mixture	170	3,324	291,066	17,464	14,740	60,222	3,485	52	80	0	390,603
Ammonium sulfate	288	3,762	6,334	55,858	25,663	9,552	65,232	38,830	241,324	69,893	536,736
Calcium cyanamide	738	7,600	16,029	5,583	342	15,092	15,041	1,250	6,538	0	68,213
Calcium nitrate	0	0	12,351	37	40	219	0	4,647	33,297	103	50,694
Nitrogen solutions[4]	0	2,116	5,083	13,132	34,193	595	4,390	14,189	95,978	21,916	191,592[5]
Sodium nitrate	2,622	16,115	381,548	2,173	259	179,619	69,218	982	447	122	653,105
Other[6]	329	4,132	15,003	60,909	103,850	57,233	75,997	28,703	89,214	9,374	94,270[7]
NATURAL ORGANIC MATERIALS											
Blood, dried	0	145	80	0	0	0	0	15	1,536	0	1,776
Castor Pomace	5,039	70	2,998	0	0	0	0	85	1,494	0	9,686
Compost	85	4,288	1,131	235	4,198	0	1,952	0	3	0	11,892
Cottonseed meal[8]	7,880	61	1,352	2	0	0	2	0	7	1	9,305
Fish scrap, meal, and emulsions	431	2	0	0	0	0	0	1	1,060	0	1,494
Manures, dried	4,116	10,271	3,057	10,806	3,714	1,558	3,135	2,325	220,877	9	259,868
Sewage sludge, activated	4,415	9,955	3,001	26,090	6,531	1,164	2,259	2,191	14,345	70	70,021
Sewage sludge, other	0	0	0	1,235	591	0	0	0	29,017	0	30,843
Tankage, animal	0	161	10	0	0	0	0	0	311	0	482
Tankage, garbage	0	12	9	0	0	0	0	0	0	0	21
Tankage, process	2,398	6,817	2,089	2,701	0	6	0	0	492	0	14,503
Other[9]	854	2	320	0	0	0	0	75	8,926	0	10,177
PHOSPHATE MATERIALS											
Ammonium phosphate: 11-48	0	1	256	0	10,865	0	71	5,076	14,000	2,797	33,066
Ammonium phosphate: 16-20[10]	0	15	69	1,098	56,895	87	60,647	34,172	87,527	2,355	242,865
Ammonium phosphate: 13-39	0	0	0	260	21,023	0	4,151	2,159	4,978	0	32,571
Ammoniated superphosphate[11]	0	0	72	0	0	0	0	929	6,651	741	8,393
Basic lime phosphate	0	0	958	0	0	2,768	0	0	0	0	3,726
Basic slag	0	2,000	33,491	0	0	151,268	8,511	0	0	0	195,270
Bonemeal, raw	246	360	272	97	61	28	118	7	973	0	2,162
Bonemeal, steamed	1,504	3,677	1,134	1,362	1	418	544	1	1,016	0	9,657
Calcium metaphosphate	0	90	1,861	5,628	14,869	5,355	245	140	101	0	28,289
Fused tricalcium phosphate	0	0	1,455	1,822	33	20,728	204	0	0	0	24,242
Phosphoric acid: 52-54%	0	0	0	0	0	0	38	5,561	9,647	0	15,246
Phosphate rock	613	11,127	20,386	606,379	190,622	7,940	35,700	200	2,414	994	876,375
Colloidal phosphate	0	1,200	911	10,726	9,627	11,015	2,462	40	320	0	36,301
Precipitated bone	470	0	0	0	0	0	0	0	0	0	470
Superphosphate: 18%	4,729	15,974	40,867	34,102	17,882	33,472	208	3,307	30,076	0	180,617
Superphosphate: 19%	3,939	10	1,146	21	262	1,006	0	18,735	40,298	0	65,417
Superphosphate: 20-22%	15,727	90,650	30,137	77,398	63,296	109,844	139,778	6,544	1,943	5,576	540,893
Superphosphate: 23-41%	0	211	0	382	2,572	26	2,781	920	55	0	6,947
Superphosphate: 42-44%	0	0	0	0	25,553	0	0	35,599	10,168	0	71,320
Superphosphate: 45%	0	205	70	16,521	35,403	1,327	23,316	8,898	3,597	1	89,338
Superphosphate: 46%	0	29	280	1,774	13,798	1,224	412	16,951	6,454	80	41,002
Superphosphate: 47%	39	65	99	612	14,567	8,532	495	2,532	585	0	27,526
Superphosphate: 48%	0	0	361	1,765	1,840	1,143	786	77	1,290	0	7,262
Superphosphate: 49-50%	0	24	0	684	451	161	2,332	95	0	0	3,747
Other[12]	0	0	1,168	0	160	0	501	31	2	322	2,184
POTASH MATERIALS											
Cotton hull ashes	889	8	52	0	0	0	0	0	0	0	949
Lime-potash mixtures: 5-10%[13]	0	1,943	21,040	0	0	2,700	0	0	0	0	25,683
Manure salts: 20-30%	0	8	1,714	173	500	4	546	0	0	0	2,945
Potassium carbonate	0	0	154	0	0	0	0	0	0	0	154
Potassium chloride: 50%	34	187	21,206	6,567	1,798	11,389	10,051	31	993	800	53,056
Potassium chloride: 60%	1,909	3,629	23,127	113,969	26,329	41,383	30,610	311	4,174	11,538	256,979
Potassium magnesium sulfate	146	243	3,299	1,971	848	952	491	0	8	3	7,961
Potassium nitrate	188	7	0	0	0	0	0	0	0	0	195
Potassium phosphate ash[11]	0	0	0	0	0	12	0	0	0	0	12
Potassium sodium nitrate[11]	19	0	11,043	0	0	596	40	180	0	0	11,880
Potassium sulfate	89	563	7,008	911	2	10,489	22	545	4,459	1,652	25,740
Tobacco stems	0	15	527	0	0	1	0	0	0	0	543
Wood ashes	0	0	5,456	0	0	0	0	0	0	0	5,456
TOTAL PRIMARY NUTRIENT FERTILIZERS	416,209	2,064,522	6,074,730	4,819,781	2,222,995	3,022,327	1,391,585	357,725	1,376,742	411,370	22,157,986
SECONDARY & TRACE ELEMENT MATERIALS[6]											
Aluminum sulfate	4	13	0	1	0	3	0	0	88	0	109
Borax	82	267	615	339	6	538	5	0	844	0	2,696
Calcium sulfate (gypsum)	406	3,241	66,185	1,865	1,241	967	1,200	29,204	472,471	0	576,780
Copper sulfate	0	56	170	166	0	2	0	2	154	0	550
Ferrous sulfate	0	0	18	2	0	0	0	64	518	0	602
Magnesium carbonate	0	0	0	0	0	0	0	0	6,122	0	6,122
Magnesium sulfate	18	158	1,041	23	0	0	0	6	119	14	1,379
Manganese sulfate	26	136	126	428	0	4	0	0	83	0	803
Mixed Minerals	0	144	11	3	0	6	21	79	2,717	0	2,981
Sulfur: 25-99+%	10	140	122	28	0	1	2,017	5,414	10,489	0	18,221
Sulfuric acid: 40-93%	0	0	0	0	0	0	0	741	2,298	0	3,039
Zinc sulfate	0	28	80	2	0	51	0	2	1,992	76	2,231
TOTAL SECONDARY & TRACE ELEM. MAT.	546	4,183	68,368	2,857	1,247	1,572	3,243	35,512	497,895	90	615,513
TOTAL ALL FERTILIZERS	416,755	2,068,705	6,143,098	4,822,638	2,224,242	3,023,899	1,394,828	393,237	1,874,637	411,460	22,773,499

[1] Includes distribution by Government agencies. Does not include the quantities of materials used for manufacture of commercial mixtures.
[2] Excludes Alaska as data was not available.
[3] Included with "Other Chemical Nitrogen materials." Regional data cannot be published without disclosing operations of individual suppliers.
[4] Includes aqua ammonia.
[5] Contains 26.83 percent nitrogen.
[6] Anhydrous ammonia, ammonium sulfate-nitrate, urea, and chemical nitrogen materials not classified.
[7] Does not include above total for anhydrous ammonia.
[8] Excludes materials distributed by other than manufacturers of fertilizers.
[9] Meals: Crab (2), Hoof and Horn (475), Linseed (583), Lupine (56), Seed (313), Soybean (219), Tung (166), Vegetable (98); Peat (23)[8]; and organics not classified 8,242 tons.
[10] Includes quantities reported as 16-20-0 mixture.
[11] Additional quantities may have been reported as mixed grades.
[12] Not classified.
[13] Includes cement flue dust. Additional quantities are given free to farmers for which no records are kept.

cent in 1952-53 to 26.87 percent in 1953-54 (Table 7). The average, for 1953-54, comprised nitrogen, 5.01; available P_2O_5, 11.59; and K_2O, 10.27 percent. The average percentages of these nutrients in 1952-53 were 4.63, 11.34, and 9.87 respectively. As compared with 1952-53, the increase in the average was 8.21 percent for nitrogen, 2.20 percent for available P_2O_5, and 4.05 percent for K_2O. The average primary nutrient content of all mixtures consumed in each State and Territory is shown in Table 7. These averages for the 51 political units covered showed for nitrogen increases in 44 and decreases in 7; for available P_2O_5 increases in 34 and decreases in 17; for K_2O, increases in 35 and decreases in 16; and for total primary nutrients, increases in 42 and decreases in 9.

MATERIALS

The consumption of fertilizer materials for direct application amounted to 7,232,423 tons in 1953-54 as compared with 7,690,384 tons in 1952-53. The quantity, in 1953-54, comprised chemical nitrogen materials 3,260,403 tons, phosphate materials (including ammonium phosphates) 2,544,886 tons, natural organics 420,068 tons, potash materials (including nitrate of potash, nitrate of soda-potash, and lime-potash) 391,553 tons, and secondary and trace element materials 615,513 tons. Compared with 1952-53 there was an increase of 273,104 tons in chemical nitrogen materials, 61,031 tons in natural organics, and 34,627 tons in potash materials. Decreases of 564,749 tons and 261,974 tons were shown in phosphate materials and secondary and trace element materials, respectively. The consumption of the principal materials comprising these classes is shown by States and regions in Tables 4 and 5.

In chemical nitrogen materials the principal changes from the previous year were increases in anhydrous ammonia (from 217,182 to 350,474 tons), nitrogen solutions including aqua ammonia (from 72,917 to 191,592 tons), and ammonium nitrate (from 846,252 to 924,716 tons). Among the natural organics, the consumption of dried manures increased from 207,127 to 259,868 tons.

Of the phosphate materials, the consumption of ammonium phosphates (11-48 and 16-20 grades) increased from 226,222 to 275,931 tons, while decreases were shown for basic slag (301,537 to 195,270 tons), phosphate rock (1,176,962 to 912,676 tons), and superphosphates grading 22 percent and under (1,046,827 to 786,927 tons). The total quantity of phosphate rock used in Illinois and Missouri, the two largest consuming States, was 722,520 tons in 1953-54, compared with 954,491 tons in 1952-53. The consumption of superphosphates grading 22 percent and under was below that in 1952-53 in 42 of the 51 States and other political units; total consumption of these grades amounted to only 42.38 percent of that in 1949-50.

The 60-percent grade of potassium chloride was greatly favored over the 50-percent grade; the respective consumptions of these grades were 256,979 and 53,056 tons, as compared with 172,210 and 110,255 tons in 1952-53.

The total consumption of gypsum decreased from 837,422 tons in 1952-53 to 576,780 tons in 1953-54. The consumption in California alone decreased from 719,788 to 414,067 tons.

The weighted average primary nutrient content of the principal classes of materials consumed is given in Table 7. These averages are based on the composition and tonnage of the individual materials comprising the several classes. For materials containing only nitrogen, P_2O_5, or K_2O, the respective national averages were 30.81, 15.70 (available P_2O_5), and 54.01 percent, while the multiple-nutrient materials averaged 17.53 percent. The corresponding averages for these classes in 1952-53 were 28.54, 14.48, 51.89, and 21.96 percent. With the exception of the multiple-nutrient materials, the national averages were higher than in 1952-53. This reflects the greater use of higher analysis products. The drop in the average concentration of multiple-nutrient materials was largely the result of the increase in consumption of dried manures, which have a low content of primary nutrients.

PRIMARY NUTRIENTS

The quantities of primary nutrients in fertilizers are based on the average analyses of the various products as published by fertilizer control officials for the State in which they were consumed, rather than on the manufacturers' guarantees. Thus, the overruns or underruns of nutrients from the guarantees are taken into account. This gives more nearly the actual tonnages of nutrients than would be the case if only the guarantees were used. The actual nutrient content usually averages somewhat higher than the guarantee.

Fertilizers consumed in the United States and Territories in 1953-54 contained 1,847,416 tons of nitrogen, 2,242,100 tons of available P_2O_5 (2,646,971 tons of total P_2O_5), and 1,806,042 tons of K_2O (Table 6). Compared with 1952-53, the quantity of nitrogen increased 210,360 tons (12.85 percent) and of K_2O 67,792 tons (3.90 percent), while available P_2O_5 and total P_2O_5 decreased 28,650 tons (1.26 percent) and 118,317 tons (4.28 percent), respectively.

The annual consumption of primary nutrients in the United States and Territories for the years 1943-44 to 1953-54 is shown in Figure 1. During the period of 1945-46 to 1949-50 the consumption of nitrogen increased at the rate of approximately 75,000 tons annually, whereas the annual rate of increase in subsequent years was about 210,000. In general, the consumption of K_2O has paralleled that of nitrogen, but with a decreasing trend in the annual rate of increase since 1950-51. It will be noted that in 1953-54 the consumption of K_2O was lower than that of nitrogen for the first time during the period 1943-44 to 1953-54. Also for the first time during this period, the consumption of available P_2O_5 took a downward turn in 1953-54.

The quantities and proportions of the nutrients consumed as mixed fertilizers in 1953-54 were 778,099 tons (42.12 percent) for nitrogen, 1,801,423 tons (80.35 percent) for available P_2O_5, 1,930,260 tons (72.92 percent) for total P_2O_5, and 1,596,032 tons (88.37 percent) for K_2O. The quantities of nitrogen, available P_2O_5, total P_2O_5, and K_2O consumed as mixed fertilizers were, respectively, 6.87, 1.07, 0.51, and 2.83 percent greater than in 1952-53.

The quantities and proportions of the nutrients consumed as fertilizer materials in 1953-54 were 1,069,317 tons (57.88 percent) for nitrogen, 440,677 tons (19.65 percent) for available P_2O_5, 716,711 tons (27.08 percent) for total P_2O_5, and 210,010 tons (11.63 percent) for K_2O. The quantities of nitrogen and K_2O consumed as materials were, respectively, 17.64 and 12.78 percent greater than in 1952-53, while the quantities of available P_2O_5 and total P_2O_5 were, respectively, 9.78 and 15.16 percent less.

The total primary nutrient content of mixed fertilizers consumed in 1953-54 amounted to 4,175,554 tons, or 2.78 percent more than the consumption (4,062,422 tons) in 1952-53. The total primary nutrient content of fertilizer materials in 1953-54 was 1,720,004 tons, or 8.61 percent more than that (1,583,634 tons) in 1952-53.

The 1953-54 consumption of fertilizer materials containing primary nutrients was 195,987 tons (2.88 per-

Table 6.—Consumption of Primary Plant Nutrients in Fertilizers, Year Ended June 30, 1954[1]

TONS

State & Region	In Mixtures					In All Fertilizers				
		P_2O_5					P_2O_5			
	Nitrogen	Available	Total	K_2O	Total N, Avail. P_2O_5, & K_2O	Nitrogen	Available[2]	Total[3]	K_2O	Total N, Avail. P_2O_5, & K_2O
Maine	11,046	17,576	18,386	20,397	49,019	11,620	18,471	19,305	20,435	50,526
New Hampshire	626	1,427	1,513	1,553	3,606	1,021	1,873	1,987	1,604	4,498
Vermont	1,191	3,665	3,793	4,953	9,809	1,414	5,740	6,054	5,089	12,243
Massachusetts	4,044	6,469	6,752	6,511	17,024	5,189	7,605	8,003	6,881	19,675
Rhode Island	736	1,340	1,419	1,356	3,432	889	1,468	1,564	1,410	3,767
Connecticut	3,764	5,678	6,041	6,209	15,651	5,110	7,394	7,863	7,552	20,056
New England	21,407	36,155	37,904	40,979	98,541	25,243	42,551	44,776	42,971	110,765
New York	29,265	57,826	60,410	46,512	133,603	37,290	69,196	72,595	47,411	153,897
New Jersey	14,027	27,751	29,172	26,604	68,382	16,745	29,330	31,136	27,575	73,650
Pennsylvania	28,378	72,700	75,579	62,683	163,761	32,046	81,258	86,554	63,357	176,661
Delaware	4,302	9,845	10,265	10,016	24,163	5,800	10,081	10,541	10,219	26,100
District of Columbia	110	182	196	123	415	154	252	268	129	535
Maryland	12,688	33,053	35,172	28,189	73,930	14,812	34,526	37,168	28,491	77,829
West Virginia	2,689	8,398	9,100	6,312	17,399	3,452	9,372	10,244	6,359	19,183
Middle Atlantic	91,459	209,755	219,894	180,439	481,653	110,299	234,015	248,506	183,541	527,855
Virginia	24,283	75,356	80,492	69,666	169,305	37,246	78,147	84,335	71,976	187,369
North Carolina	59,297	141,628	152,710	125,648	326,573	115,540	146,514	158,331	133,517	395,571
South Carolina	25,316	66,675	71,596	56,492	148,483	68,063	71,684	77,210	68,673	208,420
Georgia	44,865	104,980	113,426	99,478	249,323	88,500	110,421	119,377	106,374	305,295
Florida	58,780	82,118	97,566	78,915	219,813	72,875	84,869	104,334	82,536	240,280
South Atlantic	212,541	470,757	515,790	430,199	1,113,497	382,224	491,635	543,587	463,076	1,336,935
Ohio	41,661	130,336	139,452	129,078	301,075	53,323	135,607	147,766	130,873	319,803
Indiana	44,500	140,821	149,818	150,456	335,777	74,504	148,071	165,002	162,423	384,998
Illinois	32,913	84,799	90,297	94,486	212,198	82,166	124,109	293,239	151,955	358,230
Michigan	22,360	76,413	81,183	75,467	174,240	30,831	79,505	85,359	76,464	186,800
Wisconsin	14,517	58,516	62,200	69,213	142,246	19,736	59,755	67,088	71,803	151,294
East North Central	155,951	490,885	522,950	518,700	1,165,536	260,560	547,047	758,454	593,518	1,401,125
Minnesota	12,187	50,726	53,094	36,724	99,637	24,202	64,881	69,089	37,556	126,639
Iowa	28,764	75,396	78,621	41,385	145,545	76,119	102,398	112,932	45,525	224,042
Missouri	33,281	70,105	75,728	52,470	155,856	72,523	80,929	132,382	64,226	217,678
North Dakota	1,653	6,191	6,496	1,266	9,110	2,924	16,541	17,185	1,275	20,740
South Dakota	1,326	2,779	2,991	208	4,313	4,311	6,579	6,956	217	11,107
Nebraska	7,452	13,371	13,520	1,583	22,406	52,696	25,172	27,009	1,698	79,566
Kansas	9,719	20,244	21,431	3,495	33,458	33,262	41,890	45,752	3,979	79,131
West North Central	94,382	238,812	251,881	137,131	470,325	266,037	338,390	411,305	154,476	758,903
Kentucky	19,200	50,528	55,424	48,158	117,886	31,908	66,589	74,329	57,961	156,458
Tennessee	16,832	44,372	47,923	38,615	99,819	38,744	55,654	59,887	46,086	140,494
Alabama	35,282	84,499	91,205	63,745	183,526	80,634	101,709	110,923	70,285	252,628
Mississippi	20,334	33,797	36,423	26,793	80,924	112,299	48,570	53,888	39,536	200,405
East South Central	91,648	213,196	230,975	177,311	482,155	263,585	272,522	299,027	213,868	749,975
Arkansas	10,648	21,210	22,644	22,690	54,548	52,102	27,510	29,657	41,045	120,657
Louisiana	10,973	19,922	21,214	15,689	46,584	49,574	25,802	28,299	19,574	94,950
Oklahoma	4,136	9,368	9,849	3,888	17,392	11,435	21,415	25,764	4,799	37,649
Texas	17,755	35,174	37,064	18,771	71,700	68,669	70,142	77,942	19,623	158,434
West South Central	43,512	85,674	90,771	61,038	190,224	181,780	144,869	161,662	85,041	411,690
Montana	397	899	996	42	1,338	3,141	8,027	8,578	49	11,217
Idaho	701	926	986	136	1,763	12,494	14,996	16,070	191	27,681
Wyoming	267	584	612	44	895	1,097	3,011	3,092	44	4,152
Colorado	1,632	3,286	3,350	530	5,448	7,005	11,719	11,969	680	19,404
New Mexico	246	322	341	49	617	4,086	4,567	4,704	54	8,707
Arizona	2,586	3,241	3,363	627	6,454	32,495	12,338	12,561	956	45,789
Utah	300	570	598	107	977	4,580	3,960	4,093	134	8,674
Nevada	68	109	115	37	214	414	546	568	40	1,000
Mountain	6,197	9,937	10,361	1,572	17,706	65,312	59,164	61,635	2,148	126,624
Washington	2,037	3,944	4,089	3,187	9,168	36,243	13,704	14,297	4,709	54,656
Oregon	2,020	3,382	3,609	2,109	7,511	25,640	12,334	12,858	3,028	41,002
California	23,858	22,037	22,973	12,294	58,189	172,965	65,715	68,184	20,300	258,980
Pacific	27,915	29,363	30,671	17,590	74,868	234,848	91,753	95,339	28,037	354,638
Continental U. S.	745,012	1,784,534	1,911,197	1,564,959	4,094,505	1,789,888	2,221,946	2,624,291	1,766,676	5,778,510
Hawaii	6,180	5,269	5,754	9,334	20,783	20,964	8,324	9,160	17,513	46,801
Puerto Rico	26,907	11,620	13,309	21,739	60,266	36,564	11,830	13,520	21,853	70,247
Alaska[4]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Territories	33,087	16,889	19,063	31,073	81,049	57,528	20,154	22,680	39,366	117,048
Total: 1953-54	778,099	1,801,423	1,930,260	1,596,032	4,175,554	1,847,416	2,242,100	2,646,971	1,806,042	5,895,558
1952-53[5]	728,095	1,782,286	1,920,472	1,552,041	4,062,422	1,637,056	2,270,730	2,765,288	1,738,250	5,646,056
1951-52	648,223	1,680,705	1,806,523	1,420,395	3,749,323	1,422,160	2,199,376	2,678,070	1,581,467	5,203,003

[1] Includes Government distribution.
[2] Includes, as available P_2O_5, 2 percent of the colloidal phosphate and 3 percent of the phosphate rock marketed for direct application.
[3] Includes, as total P_2O_5, 22 percent of the colloidal phosphate and 32 percent of the phosphate rock marketed for direct application.
[4] Not available. In 1952-53, total primary plant nutrients in all fertilizers amounted to 273 tons.
[5] Revised. Excess quantities of 1,960 tons of K_2O in mixtures in Kansas and 2,702 tons of total P_2O_5 in all fertilizers in Idaho were reported for 1952-53.

Table 7.—Weighted Average Content of Primary Plant Nutrients in Fertilizers in Percent, Year Ended June 30, 1954[1]

State & Region	Mixtures[2]				Materials					Total Nutrients in Mixtures and Materials
					Single Nutrient[3]					
	N	Available P_2O_5	K_2O	Total Nutrients	N	Available P_2O_5[4]	K_2O	Multiple Nutrients[2]	Total Nutrients	
Maine	6.70	10.67	12.38	29.75	28.51	19.91	53.42	12.23	21.67	29.43
New Hampshire	5.29	12.07	13.13	30.49	29.54	20.35	53.56	10.41	22.43	28.47
Vermont	4.32	13.30	17.97	35.59	28.44	21.28	60.87	13.87	22.44	31.87
Massachusetts	5.85	9.36	9.42	24.63	18.76	18.46	60.38	11.29	16.82	23.18
Rhode Island	5.47	9.96	10.08	25.51	17.53	17.86	59.07	11.98	16.82	24.39
Connecticut	5.77	8.71	9.52	24.00	21.33	22.21	56.45	13.07	17.79	22.29
New England	6.08	10.27	11.64	27.99	22.73	20.66	57.69	12.48	19.01	26.61
New York	5.70	11.27	9.06	26.03	25.92	20.01	55.02	10.05	21.28	25.29
New Jersey	5.27	10.43	10.00	25.70	24.14	17.01	57.07	11.38	21.32	25.33
Pennsylvania	4.67	11.95	10.31	26.93	25.06	17.35	57.07	10.08	18.37	26.04
Delaware	4.85	11.09	11.28	27.22	34.49	22.59	59.82	9.06	32.35	27.54
District of Columbia	5.77	9.54	6.45	21.76	13.37	35.09	60.56	13.02	15.18	19.85
Maryland	4.34	11.32	9.65	25.31	24.66	16.83	12.65	12.08	19.27	24.92
West Virginia	3.96	12.38	9.30	25.64	21.62	19.22	59.74	9.92	19.18	24.86
Middle Atlantic	4.98	11.41	9.82	26.21	25.63	18.61	41.52	10.47	20.39	25.57
Virginia	3.54	11.00	10.17	24.71	19.91	18.43	14.05	10.13	18.53	23.94
North Carolina	3.98	9.50	8.43	21.91	19.96	16.18	37.38	11.62	20.67	21.68
South Carolina	3.77	9.92	8.41	22.10	20.10	16.22	53.21	20.26	22.50	22.21
Georgia	4.07	9.52	9.02	22.61	22.11	16.02	54.53	19.77	22.86	22.65
Florida	5.49	7.66	7.36	20.51	22.09	9.02	42.35	15.46	18.58	20.33
South Atlantic	4.23	9.37	8.57	22.17	20.66	14.99	40.16	15.63	21.22	22.01
Ohio	4.09	12.80	12.68	29.57	32.45	16.80	49.15	10.91	24.80	29.24
Indiana	4.34	13.75	14.69	32.78	36.07	14.19	58.58	9.99	31.52	32.62
Illinois	5.21	13.43	14.96	33.60	40.34	5.97	61.40	11.23	16.71	23.80
Michigan	4.10	14.01	13.84	31.95	31.94	16.62	51.37	9.11	23.13	31.16
Wisconsin	3.61	14.55	17.21	35.37	37.38	6.56	56.52	9.74	23.30	34.31
East North Central	4.31	13.56	14.32	32.19	37.17	7.16	60.22	10.28	19.65	29.07
Minnesota	4.84	20.16	14.60	39.60	45.45	34.11	59.44	28.97	38.08	39.27
Iowa	6.83	17.91	9.83	34.57	42.53	21.32	57.89	38.42	33.95	34.36
Missouri	7.10	14.96	11.19	33.25	44.27	5.74	58.33	23.27	21.48	28.77
North Dakota	7.17	26.85	5.49	39.51	33.17	45.36	60.50	51.78	47.28	43.52
South Dakota	9.90	20.74	1.55	32.19	44.89	39.69	55.10	37.62	40.91	37.01
Nebraska	11.30	20.28	2.40	33.98	47.29	33.66	60.50	33.23	43.11	40.08
Kansas	9.76	20.33	3.51	33.60	41.99	33.02	57.38	41.93	39.30	36.67
West North Central	7.03	17.78	10.21	35.02	44.35	18.85	58.26	38.50	32.80	34.14
Kentucky	4.24	11.16	10.64	26.04	32.69	22.56	53.73	7.99	29.97	26.91
Tennessee	4.26	11.23	9.77	25.26	32.74	24.93	49.30	14.50	31.63	26.82
Alabama	4.21	10.09	7.61	21.91	22.69	12.87	59.27	13.61	20.03	21.36
Mississippi	5.74	9.54	7.56	22.84	36.65	13.83	56.04	30.65	31.42	27.28
East South Central	4.49	10.45	8.69	23.63	30.89	16.62	54.43	13.94	27.26	24.81
Arkansas	5.49	10.94	11.71	28.14	34.84	23.52	57.07	37.80	37.38	32.55
Louisiana	6.33	11.49	9.05	26.87	36.61	16.78	57.20	34.45	33.52	29.89
Oklahoma	6.41	14.52	6.03	26.96	36.25	18.96	59.44	35.64	25.20	25.98
Texas	6.31	12.50	6.67	25.48	39.46	21.29	59.22	34.87	31.31	28.37
West South Central	6.10	12.01	8.56	26.67	36.89	20.37	57.24	35.04	32.64	29.58
Montana	9.38	21.23	0.99	31.60	29.17	47.33	60.60	43.18	40.70	39.47
Idaho	10.33	13.64	2.00	25.97	28.91	34.31	61.39	44.66	33.37	32.78
Wyoming	11.22	24.55	1.85	37.62	37.49	44.44	0	35.62	41.91	40.90
Colorado	11.11	22.37	3.61	37.09	46.26	44.41	59.15	13.82	43.91	41.75
New Mexico	11.46	15.00	2.28	28.74	56.18	32.77	0	35.91	40.05	38.96
Arizona	12.05	15.10	2.92	30.07	34.46	35.90	50.36	35.21	34.84	34.08
Utah	8.28	15.74	2.95	26.97	29.62	33.71	60.50	33.32	31.44	30.87
Nevada	7.79	12.48	4.24	24.51	23.53	36.59	60.50	33.25	30.93	29.29
Mountain	11.03	17.68	2.80	31.51	34.14	38.48	54.34	37.26	36.12	35.40
Washington	6.87	13.31	10.76	30.94	36.64	31.48	58.87	36.35	36.31	35.28
Oregon	9.19	15.39	9.59	34.17	28.37	24.49	59.97	37.80	30.25	30.90
California	10.78	9.96	5.56	26.30	30.51	26.69	52.51	12.87	23.14	23.78
Pacific	10.23	10.76	6.45	27.44	31.15	27.18	55.37	15.41	25.34	25.76
Continental U. S.	4.88	11.70	10.26	26.84	31.05	15.69	53.80	17.32	25.95	26.57
Hawaii	10.44	8.91	15.78	35.13	25.52	18.47	59.28	48.59	32.20	33.44
Puerto Rico	12.02	5.19	9.71	26.92	20.80	23.22	58.68	21.98	20.99	25.88
Alaska[5]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Territories	11.69	5.97	10.98	28.64	23.36	18.73	59.27	45.29	28.05	28.45
U. S. Average:										
1953-54	5.01	11.59	10.27	26.87	30.81	15.70	54.01	17.53	25.99	26.61
1952-53	4.63	11.34	9.87[6]	25.84[6]	28.54	14.48	51.89	21.96	23.24	25.05[6]
1951-52	4.30	11.14	9.42	24.86	27.96	14.71	49.98	20.97	22.16	24.04

[1] Excludes materials not guaranteed to contain N, P_2O_5, or K_2O.
[2] Guaranteed to contain two or more of the primary plant nutrients, N, P_2O_5, or K_2O.
[3] Guaranteed to contain only one of the primary plant nutrients.
[4] Includes the available P_2O_5 content of colloidal phosphate and phosphate rock as 2 percent and 3 percent, respectively.
[5] Not available.
[6] Revised.

cent) less than in 1952-53. The consumption of all fertilizers (materials and mixtures) containing primary nutrients was 1.67 percent below the 1952-53 level, whereas the total quantity of primary nutrients supplied by these fertilizers increased 4.42 percent.

The percentage change in consumption of primary nutrients in 1953-54 as compared with 1952-53 is shown by States and other political units in Figure 2. Percentage increases in nitrogen were generally highest in the West North Central and the West South Central States. These regions consumed 17.72 percent of the total primary nutrients in mixed fertilizers and 28.98 percent of the total in materials (Table 6a). The percentage change in nitrogen consumption ranged from a decrease of 13.08 percent in Maine to an increase of 117.18 percent in South Dakota. Wide variations are also shown in the percentage changes in the consumption of P_2O_5 and K_2O.

Table 6a.—Regional Distribution of Consumption of Primary Nutrients, as Percentages of Respective Totals in Mixtures and Materials, Year Ended June 30, 1954.

Region	N		Available P_2O_5		K_2O	
	Mixtures	Materials	Mixtures	Materials	Mixtures	Materials
New England	2.75	0.36	2.01	1.45	2.57	0.95
Middle Atlantic	11.75	1.76	11.64	5.51	11.31	1.48
South Atlantic	27.32	15.87	26.13	4.74	26.95	15.65
East No. Cent.	20.04	9.78	27.25	12.74	32.50	35.63
West No. Cent.	12.13	16.05	13.26	22.60	8.59	8.26
East So. Cent.	11.78	16.08	11.83	13.46	11.11	17.41
West So. Cent.	5.59	12.93	4.76	13.43	3.82	11.43
Mountain	0.80	5.53	0.55	11.17	0.10	0.27
Pacific	3.59	19.35	1.63	14.16	1.10	4.97
Territories	4.25	2.29	0.94	0.74	1.95	3.95
United States	100.00	100.00	100.00	100.00	100.00	100.00

USDA SUPPLEMENTARY REPORT

Fertilizer Situation for 1954-55

prepared by

A. L. Mehring and C. A. Graham

Commodity Stabilization Service

Food & Materials Requirements Division

USDA

This report supplements fertilizer supply estimates for 1954-55 issued in September 1954.

As was the case a year earlier, movement of fertilizer was slow in the autumn of 1954. The tonnage of fertilizers moved into trade channels in late 1954 was no larger than in the corresponding period of 1953, when the movement was 12 percent lower than in 1952. Except in the East South Central Region, where fall movement exceeded that of 1953 by about 25 percent, movement was about the same or lower.

Movement has continued slow in 1955. From January 1 to March 15, 1955 less fertilizer moved in nearly every State than in the same period of the preceding year, declining to an average of about 85 percent. Trade was particularly poor in some of the Central States, where the comparative movement for the entire region was only about 70 percent. This decline is thought to be due to a combination of factors, including adverse weather conditions, declining farm income, and a tendency for consumers to revert to their pre-war habit of waiting to order until the fertilizer is needed.

Prior to 1942, more than half of the total consumption in any given year moved to the farm between March 15 and May 15. From 1942 to 1952, inclusive, however, shortages of certain fertilizers caused many mixers, dealers, and farmers to take delivery in advance of need. This tended to spread the movement over a much longer period and reduced the load at the planting season. In the second half of 1954, there was a return to the pre-World War II patern, although supplies of all types of fertilizers in general equalled the demand.

Since December 1, 1954 buyers have been waiting until they needed fertilizer before ordering. This reluctance to buy in advance seems to trace to a belief that fertilizer price changes are more likely to be down than up.

Funds for the Agricultural Conservation Program are larger for the 1955 calendar year than they were for 1954, and about the same size as those for 1953. The 1955 program has been changed to provide for the use of nitrogen as well as for phosphoric oxide and potash.

Nutrients

The trend in usage is still toward more concentrated materials, and mixtures containing higher percentages of nitrogen and potassium and less calcium and sulfur. Thus as much nitrogen and potash may be moved this season as in the previous one in spite of a smaller tonnage of fertilizers.

Distribution facilities may be strained in April and May to handle the volume of fertilizer demand, but there will be no lack of adequate production facilities this year.

Nitrogen

On July 1, 1954 capacity to produce synthetic ammonia was equivalent to 2,370,000 tons of nitrogen. Since then ten new plants or additions to existing ones have been completed, and five others are scheduled for completion before July 1 next, when total rated capacity is expected to be approximately 2,976,000 tons of contained nitrogen. This is about 200,000 tons more capacity than was so scheduled last fall. Contracts have been let or work started on the erection of nine additional plants with a rated capacity to fix atmospheric nitrogen of 412,000 tons annually. Plans have been announced also to erect yet more plants, but some of these facilities may not be built.

About 250,000 tons of fertilizer nitrogen becomes available annually in the form of by-product ammonium sulfate, "B" liquor and natural organics.

The supply of fertilizer nitrogen for the year ending June 30, 1955 is currently estimated to be 2,126,000 short tons, or 5.2 percent more than the supply for 1953-54 (Table 1). Production of ammonium

Table 1.—NITROGEN

Revised estimates[1] of 1954-55 supply for fertilizer purposes, United States and possessions.
(In short tons of nitrogen)

Item	Ammonium Nitrate All Grades	Ammonium Sulfate & Ammonium Sulfate Nitrate	Other Solids[2]	Natural Organics	Compound Solutions for ammoniation	Compound Solutions direct application	Ammonia[3] for ammoniation	Ammonia[3] direct application	Totals
U. S. Production									
Synthetic ammonia	389,000	225,000	120,000	.....	410,000	75,000	110,000	390,000	1,719,000
By-product ammonia	.....	177,000[4]	.....	.....	.....	.....	3,000	.....	180,000
Natural organics	.....	.....	.....	30,000	.....	.....	.....	.....	30,000
Total	389,000	402,000	120,000	30,000	410,000	75,000	113,000	390,000	1,929,000
Exports[5]	10,000	70,000	25,000	1,000	15,000	.....	1,000	.....	122,000
Supply from domestic sources	379,000	332,000	95,000	29,000	395,000	75,000	112,000	390,000	1,807,000
Imports[5]	105,000	50,000	160,000	4,000	.....	.....	.....	.....	319,000
Total Supply	484,000	382,000	255,000	33,000	395,000	75,000	112,000	390,000	2,126,000
Percent change of September, 1954 estimate									— 3.4
Percent change from 1953-54 supply									+ 5.2

[1] Based on actual production during eight months, exports and imports for the first six months, and on rates of production and similar information for the rest of the period.
[2] Includes estimated ammonium phosphates, sodium nitrate, urea, calcium nitrate, cyanamid and nitrophosphates.
[3] Includes aqua ammonia.
[4] Includes ammonium phosphate produced from by-product ammonia.
[5] Includes the estimated nitrogen content of imported and exported mixed fertilizers and ammoniated superphosphate.

sulfate has been increased substantially, because five companies that did not produce this material prior to May 1, 1954 now do so. However, imports are lower and exports higher than previously forecast. Estimates for production of some of the other synthetic ammonia materials have been changed slightly from the September 1954 figures, but they are still substantially above the quantities produced in the 1953-54 season.

Present estimates for exports in 1954-55 have been increased, partly because commercial exports have been increasing and partly because of the decision of the Foreign Operations Administration to finance the export of 28,000 tons of nitrogen to India, Turkey, and Pakistan, largely in the form of sulfate.

Imports of nitrogen in 1954-55 have in general been lower than previously estimated, especially so in the case of ammonium sulfate.

On February 28, 1955 stocks of ammonium sulfate and of fertilizer-grade ammonium nitrate in the hands of primary producers were 28,379 and 44,318 tons greater respectively than a year earlier.

Table 2.—PHOSPHORUS

Revised estimates of 1954-55 supply for fertilizer purposes, United States and possessions.
(In short tons of available phosphoric oxide, P_2O_5)

Item	Normal superphosphate[1]	Concentrated superphosphate	Other[2]	Totals
U. S. Production	1,600,000	530,000	250,000	2,380,000
Exports[3]	80,000	60,000	26,000	166,000
Supply from domestic sources	1,520,000	470,000	224,000	2,214,000
Imports[3]	1,000	1,000	70,000	72,000
Total supply	1,521,000	471,000	294,000	2,286,000
Percent change of September, 1954 estimate				— 2.7
Percent change from 1953-54 supply				— 3.3

[1] Includes wet-mixed base goods.
[2] Includes ammonium phosphates, basic slag, fused rock phosphate, liquid phosphoric acid, dicalcium phosphate, high-grade residue, natural organics, and other sources of available P_2O_5.
[3] Includes the P_2O_5 content of mixed fertilizers and ammoniated superphosphate.

Table 3.—POTASSIUM

Revised estimates[1] of 1954-55 supply for fertilizer purposes, United States and possessions.
(In short tons of potassium oxide, K_2O)

Item	Potassium chloride	Potassium sulfate and sulfate of potash-magnesia	Manure salts	All other materials[2]	Totals
Domestic deliveries	1,640,000	107,000	1,000	35,000	1,783,000
Exports[3]	51,000	6,000	.....	4,000	61,000
Supply from domestic sources	1,589,000	101,000	1,000	31,000	1,722,000
Imports[3]	86,000	28,000	.....	5,000	119,000
Total Supply	1,675,000	129,000	1,000	36,000	1,841,000
Percent change of September, 1954 estimate					— 6.5
Percent change from 1953-54 supply					+ 0.6

[1] Estimated on the basis of actual exports, imports and deliveries up to April 1, 1955 and present prospects for the rest of the season rather than the quantities above ground at the mines, or obtainable by import.
[2] Includes potassium nitrate, potassium carbonate, potash-lime, nitrate of soda-potash, and natural organics.
[3] Includes the potash content of mixed fertilizers.

Phosphorus

Exports of all classes of phosphates have increased more during the current year than was expected last fall. The revised estimates are given in Table 2. It appears now that the domestic supply of P_2O_5 will be about three percent less in 1954-55 than in the preceding season.

Since July 1, 1954 available P_2O_5 productive capacity, on the basis of one-shift days, has increased about 90,000 tons. The increase is largely in the form of concentrated superphosphate, but includes some diammonium phosphate and phosphoric acid capacity.

Potassium

Revised estimates of potash supplies, based on actual deliveries for the first nine months of the fiscal year, are somewhat lower than the previous ones. Exports are larger than expected. It is currently estimated that about the same quantity of fertilizer K_2O will be available for use in 1954-55 as in 1953-54. This is six percent less than was expected last September. Details are given in Table 3.

Capacity to produce potassium sulfate is being currently increased.

A report based on trade deliveries of nitrogen, phosphates and potash during 1954-55, and a forecast of supplies for 1955-56, is scheduled to be issued after the close of the current season.

6th ANNUAL PACIFIC N. W. CONFERENCE

The Sixth Annual Fertilizer Conference sponsored by the Pacific Northwest Plant Food Association will be held at Boise, Idaho, June 28-29-30, 1955 and from early indications a record attendance is anticipated.

The program is being arranged by the Soil Improvement Committee of the Association.

Tuesday—June 28

Chairman: Jack Wursten, Simplot Soilbuilders, Idaho Falls, Idaho

8:00 Registration, Boise Hotel Lobby

8:30 Film on Aerial Applications

9:00 Introductions and Greetings—Jack Wursten
Welcome—Carol Youngstrom, Associate Director, Extension Service, University of Idaho, Boise, Idaho
Jack Simplot, J. R. Simplot Co., Boise, Idaho

9:30 "Soil Moisture—Fertility Relationships as They Affect the Yield and Quality of Sugar Beets," Jay L. Haddock, Soil Scientist, USDA, Logan, Utah

9:55 "Fertilization of Sugar Beets in Boise Valley," Ted Gessel, Research Agronomist, Amalgamated Sugar Co., Nampa, Idaho

10:20 Break

10:30 "Fertilizer Studies on Russet Burbank Potatoes," Lee I. Painter, Assistant Agronomist, University of Idaho, Aberdeen, Idaho

10:55 "Review of Fertilizer Situation on Southern Idaho's Drylands" Francis H. Siddoway, Project Supervisor, USDA, Tetonia, Idaho

11:20 "Wheat Fertilization in the Pacific Northwest," G. O. Baker, Professor of Agronomy, University of Idaho, Moscow, Idaho

11:40 Discussion

12:05 Luncheon, Boise Hotel; M.C., Ralph Nyblad; Guest speaker to be announced later; Topic on "Isotopes and Agriculture."

1:30 Field trip to Branch Experiment Stations at Parma, Idaho and Ontario, Oregon and to Amalgamated Sugar Co. Fertilizer Field Trials for observation and results of fertility work. (Buses leave from Boise Hotel at 1:30)

6:00 Cocktail hour, Boise Hotel

7:00 Banquet—Boise Hotel, M. C., Rod Bertramson. Introduction of distinguished guests — N.F.A., A.P.F.C. Guest speaker—to be announced later.

Wednesday—June 29

Chairman—Charles G. Painter, University of Idaho Extension Service, Boise, Idaho

8:30 "A Dairy Farmer Looks at the Soil Fertility Program," David G. Tate, Triangle Dairy, Boise Idaho

8:55 "Fertilizer's Place In The Production of Irrigated Pastures," George Cleveland, Assistant Supt. Caldwell Branch Experiment Station, Caldwell, Idaho

9:20 "Soil Fertility Research on Alfalfa Production In Northern Idaho," Tom Brackney, Supt. Branch Experiment Station, Sandpoint, Idaho

9:45 "Soil Fertility Research on Forages in the Columbia Basin," C. E. Nelson, Agronomist, Irrigation Experiment Station, Prosser, Washington

10:10 Break

10:20 "Fertilizer Application by Airplane," Harold Hansen, Farwest General Agency, Seattle, Washington

10:45 "Soil Fertility Research in Mountain Meadows," Forrest M. Willhite, Agronomist, USDA, Grand Junction, Colorado

11:10 "Soil Fertility Concepts Pass in Review," Roger H. Bray, Professor, Soil Fertility, University of Illinois, Urbana, Illinois

12:10 Luncheon—Boise Hotel—M.C., Karl Baur
"Fertilizer, Agriculture, and Economics," G. B. Wood, Head of Department of Agricultural Economics, Oregon State College, Corvallis, Oregon

1:30 Field trip to Branch Experiment Station, Caldwell, Idaho and to visit the Wayne Naugle farm for observation and results from fertilizer use. Also, there will be demonstrations on aerial and injection applications of fertilizer.

7:00 Barbecue—Boise Hotel

Thursday—June 30

Chairman—H. B. Cheney, Head, Department of Soils, Oregon State College, Corvallis, Oregon

8:30 "Liquid Fertilizers," K. D. Jacob, Head, Fertilizer and Agricultural Lime Section, USDA, Beltsville, Maryland

9:20 "Correlation of Soil Tests With Yield Response in Oregon," L. A. Alban, Assistant Soil Scientist, Oregon State College, Corvallis, Oregon

9:45 "Correlation of Soil Test Results With Yield Response in Washington," H. M. Reisenauer, Assistant Professor of Soils, State College of Washington, Pullman, Washington

10:10 Break

10:20 "Some Soil Testing Results on Idaho Soils," Glenn C. Lewis, Assistant Agricultural Chemist, University of Idaho, Moscow, Idaho

10:45 "Relationships of Sodium Bicarbonate and CO^2 Soluble Phosphorus and Potassium in Soil With Total Content in Plant," James P. Thorne, Soil Scientist, Utah State Agricultural College, Logan, Utah

11:10 "Studies on Correlation of Soil Tests With Yield Response," Bion Tolman, General Agricultural Supt., Utah-Idaho Sugar Co., Salt Lake City, Utah

11:30 "Correlation of Soil Test Results With Yield Response and Phosphate Uptake," Sterling R. Olsen, Senior Soil Scientist, USDA, Fort Collins, Colorado

12:00 Luncheon, unscheduled

Chairman—F. T. Tremblay, Washington Co-operative, Seattle Washington

1:15 "Leaf Sampling Techniques For Various Western Washington Crops," Harry A. Kittams, Jr. Soil Scientist, Western Washington Experiment Station, Pyallup, Washington

1:40 "Correlation Between The Soil and Leaf Levels of Potassium," F. S. Fulmer, American Potash Institute, Newport Beach, California

2:05 "Plant Analysis for Nutrient Surveys," Nels R. Benson, Assoc. Soil Scientist and Horticulturist, Tree Fruit Experiment Station, Wenatchee, Washington

2:25 Discussion

3:00 Adjourn

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GEORGIA SOCIETY HONORS GRAZING CONTEST WINNERS

Members of the Georgia Plant Food Educational Society met at Atlanta May 20 to honor winners in the Grazing System Contest with a banquet at the Biltmore Hotel.

More than 150 interested persons were on hand to see the presentation of cash awards to three state-wide prize winners and three winners in each of the six geographic districts of the state.

Featured speaker for the occasion was a man who has done much to develop the growth of pasturelands in the coastal areas, Dr. Glenn W. Burton, principal geneticist at the Coastal Plain Experiment Station in Tifton, Ga. Dr. Burton, whose efforts produced the widely-accepted coastal bermuda grass, was recently honored by Progressive Farmer magazine as "man of the year in southern agriculture.

Illustrating his talk with color film slide projections, he reviewed performance of the popular pasture grass varieties during the two-to-three season dry spell which has plagued agriculture over much of the nation. The slides clearly showed superiority of coastal bermuda in most sections of the state under conditions that prevailed during this period. Dr. Burton pointed out, however, the specialized purposes and conditions under which other types of grasses excelled.

Coastal bermuda was shown to produce about twice the tonnage of common bermuda under normal conditions of rainfall, but 6 to 8 times the tonnage during extended dry seasons. In addition, he told how it utilizes available fertilizer as well as water better than other varieties, and offers dependable grazing, silage and hay under most circumstances. Dr. Burton emphasized that good pasture production requires not only dependable plants, but also dependable animals an dependable people, as well.

W. A. Sutton, associate AES director, who presided at the luncheon meeting, turned the program over to Dr. C. C. Murray, dean of the U. of Ga. College of Agriculture, for presentation of the cash awards amounting to over $1500. He gave checks for $100, $75 and $50 respectively to first, second and third-place winners in each of the six districts, then awarded three cash prizes for the statewide judging, asking winners of the latter to make a statement concerning their pasture-management programs.

Henry Blitch of Statesboro, top prize winner, reviewed his program and concluded that it is "cheaper to use adequate amounts of fertilizer than to take a chance on having to buy feed" to supplement the pastures' production.

J. E. Nunnally of Cotton Producers Assn. in Atlanta, chairman of the Citation Committee, presented the annual citation of the Society to Ralph Griffin of Douglas, whose services as a banker, fertilizer dealer, and farmer were commended for their contribution to the advancement of agriculture in the state.

J. Ralph Johnson, AES agronomist, summarized the observations of the state judges in the Grazing System contest, and Ga. PFES President W. W. Harley of Southern Fertilizer & Chemical Co., Savannah, closed the meeting with the announcement that the Society's directors, meeting that morning, had decided to sponsor the Grazing System contest again next year.

1. At presentation of statewide Grazing System first prize: W. A. Sutton, AES associate director, Athens, who presided at the banquet; Henry Blitch, top prize winner, of Statesboro; Byron Dyer, county agent, Statesboro; Dr. C. C. Murray, dean of College of Agriculture, Athens, who passed out awards. **2.** Speaker Dr. Glenn Burton, principal geneticist at Coastal Plain Experiment Station, Tifton; Ga. PFES President W. W. Harley, Southern Fertilizer & Chemical Co., Savannah; Ga. PFES Secretary-Treasurer Dr. J. Fielding Reed, American Potash Institute, Atlanta. **3.** Citation Committee Chairman J. E. Nunnally of Cotton Producers Assn., Atlanta, presents annual citation to Ralph Griffin of Douglas. (Center and bottom rows of photographs taken at North Fulton Park in Atlanta on the preceding evening, as Spencer Chemical Co. honored officers, directors and members of Ga. PFES with a barbecue.) **4.** W. L. Baughcum, International Minerals & Chemical Corp., East Point; Frank Koontz, Armour Fertilizer Works, Atlanta; and W. P. Burke, International Minerals & Chemical Corp., Albany. **5.** Host and hostess Mr. & Mrs. Kirk Sanders, Spencer Chemical Co., Atlanta. **6.** Julian Reames of Atlanta and W. A. Higginbotham, Jr., Albany, both with Armour Fertilizer Works. **7.** Dr. J. Fielding Reed of American Potash Institute, Atlanta, and Loy Everett of Virginia-Carolina Chemical Corp., Albany. **8.** Harold Dinges and Claude Byrd of Spencer Chemical Co., Kansas City. **9.** W. W. Doughty, Augusta Fertilizer Co., Augusta; John Porter, F. S. Royster Guano Co., Atlanta; W. W. Harley, Southern Fertilizer & Chemical Co., Savannah; and B. L. Garrett, International Minerals & Chemical Corp., East Point. **10.** Listening to amplified playback of conversation and group singing on magnetic recorder are (clockwise from foreground) Walter Strobhert of Spencer Chemical Co., Atlanta; Joe Shepherd, Virginia-Carolina Chemical Corp., Atlanta; and Jim Reed, Spencer Chemical Co., Atlanta.

Great Plains Ammonia Provides Ad Aid To Members

Plans for providing members with increased advertising, merchandising and publicity help have been completed by the Great Plains Agricultural Ammonia Association, according to Barney A. Frankl, President of the group. The group program is designed to provide material suitable for use by members in their local promotions for agricultural ammonia.

Objectives include stressing the value of a balanced fertilization program based on soil testing for maximum benefits from nitrogen application. All items being prepared will be such that the member's name and brand can be featured.

To assist the association with the program, the board of directors have appointed the L. W. Ramsey Advertising Agency to prepare advertising and merchandising items and coordinate publicity projects. The agency, with offices in Chicago and Davenport, Iowa, has been engaged in the promotion of farm products for Midwest advertisers for over thirty years. The Ramsey Agency farm team assigned to the account includes F. P. Shaffer, Paul F. Downing, Gordon Fowler and Gene Carr.

The first promotion kit has been completed and is being shipped to paid-up members of Great Plains. Kit number two will be presented as a part of the association Midwest Trade Show program scheduled for Des Moines and Ames, Iowa, July 21-22.

Information on the program and the G.P.A.A.A. Annual Midwest Trade Show and Field Day can be secured by writing to James Andrew, Secretary of the Association, Box 447, Jefferson, Iowa.

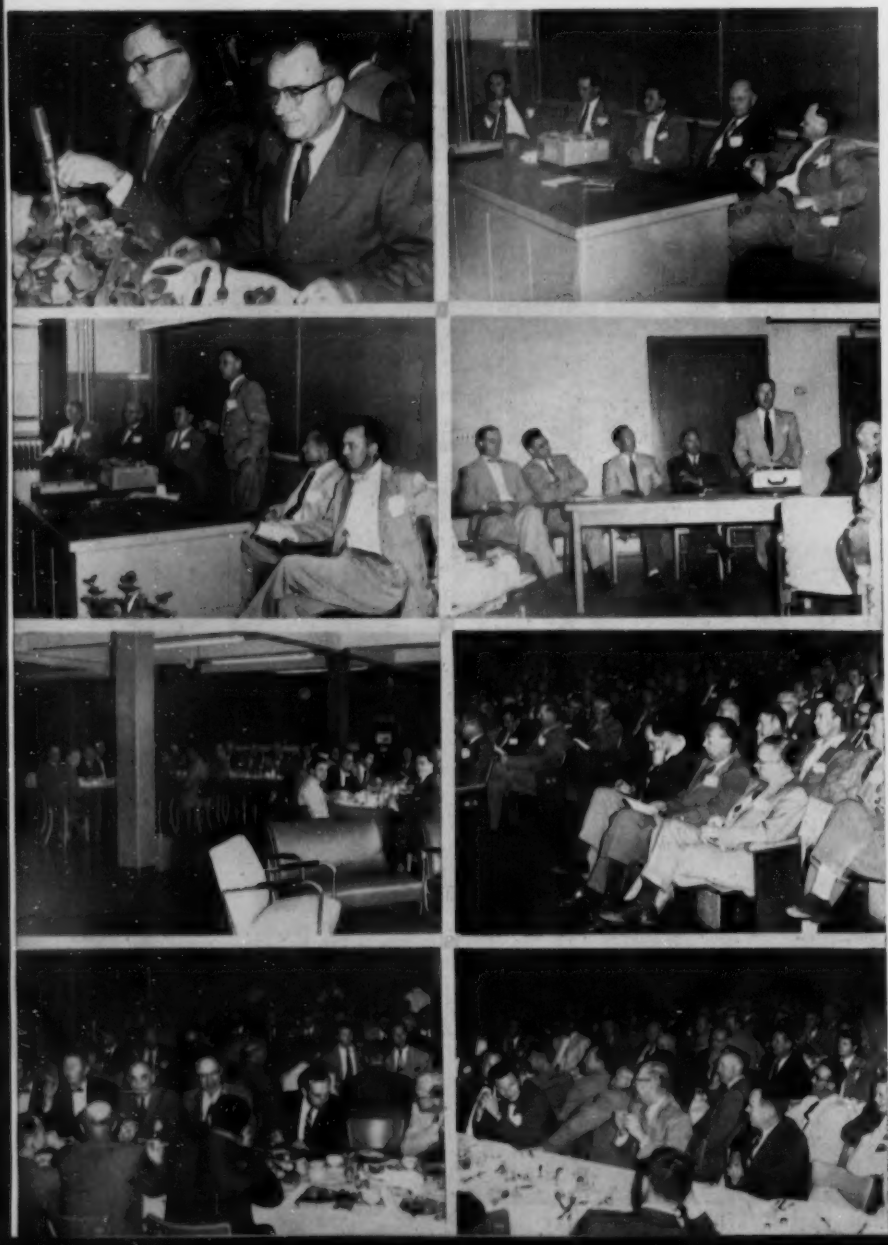
Great Plains Ammonia Meet

Great Plains Agricultural Ammonia Association Midwest Trade Show and Field Day is scheduled for July 20-21. Business session and show July 20 at Hotel Ft. Des Moines for members only. Field Day, which is being held in cooperation with Iowa State College, will be held at Ames, Iowa, July 21, and is open to the public. Details and reservations may be secured by writing to James Andrew, Secretary, Great Plains Agricultural Ammonia Association, Box 447, Jefferson, Iowa.

Oklahoma Association To Meet June 16

President George Summers, Jr. has announced that the Oklahoma Plant Food Association annual meeting has been set for June 16, 10:00 a.m., at the Tulsa Hotel, Tulsa, Oklahoma. There will be an election of new officers and Board Directors. Arrangements will be made for luncheon in the meeting room.

Pictures From The Recent California Conference



CFA PICTURES

1. At banquet, Hotel El Rancho, Dr. H. J. Gramlich, Chicago & Northwestern Railroad, Chicago, Speaker; J. H. Nelson, Nelson Laboratories, Stockton, Conference Chairman.

2. Deciduous and Citrus Fruit Crop Panel: Dr. D. G. Aldrich, Jr., University of California, Davis; Dr. E. F. Serr, University of California, Davis; Panel Moderator, Robert E. Whiting, Swift & Company, Hayward; Dr. E. L. Proebsting and Dr. Omund Lilleland, both from University of California, Davis.

3. Vegetable Crops Panel: Forest Fullmer, American Potash Institute, Newport Beach; Dr. J. E. Knott, University of California, Davis; Howard H. Hawkins, Golden State Plant Food Co., Glendora; Panel Moderator, Weir Fetters, Best Fertilizer Co., Stockton; John Pryor, John Pryor Co., Salinas; Dr. O. A. Lorenz, University of California, Davis.

4. Field and Forage Crop Panel: Dr. W. A. Williams, University of California, Davis; G. D. Manuel, Vice Pres., Spreckels Sugar Co., San Francisco; Dr. D. S. Mikkelsen, University of California, Davis; A. George Park, Balfour, Guthrie & Co., Ltd., San Francisco; Panel Moderator, John Tollefson, Triangle Co., Salinas; Dr. W. E. Martin, University of California, Berkeley.

5. Joint meeting, University of California Fertilizer Committee and CFA Soil Improvement Committee, Hunt Hall, Davis.

6. Portion of attendance at morning session, Chemical Auditorium, University of California.

7. & 8. Portion of banquet group, Hotel El Rancho.

COOPERATIVE PROGRAM
THE NATIONAL JOINT COMMITTEE ON FERTILIZER APPLICATION
And
THE AMERICAN SOCIETY OF AGRONOMY

Monday, August 15, 1955; University of California; Davis, California

Presiding: D. G. Aldrich, Jr. (University of California), Vice Chairman, The National Joint Committee on Fertilizer Application

UNSOLVED PROBLEMS OF SOIL FERTILITY IN THE WEST—Frank G. Viets, Technical Staff Specialist, Western Soil and Water Management Section, United States Department of Agriculture, Fort Collins, Colorado

A COMPARISON OF THE FERTILIZER VALUE OF GASEOUS, LIQUID, AND SOLID FORMS OF AMMONIA-CONTAINING NITROGEN COMPOUNDS—O. A. Lorenz, Associate Professor, Department of Vegetable Crops, University of California, Davis, California

APPLICATION OF FERTILIZERS THROUGH SPRINKLERS—D. W. Henderson, Assistant Professor, Department of Irrigation, University of California, Davis, California

IRRIGATION - FERTILIZATION INTER - RELATIONSHIPS AS THEY AFFECT YIELD AND QUALITY OF SUGAR BEETS—Jay L. Haddock, Soil Scientist, United States Department of Agriculture, Logan, Utah, and Sterling A. Taylor, Soil Physicist, Department of Agronomy, Utah State College, Logan, Utah

RECENT DEVELOPMENTS IN FARM PLACEMENT MACHINERY—Tobias Grether, Grether Equipment Company, Oxnard, California

FERTILIZER APPLICATION AND IMPROVED CROP YIELDS IN THE WEST—B. A. Krantz, Area Supervisor, Western Soil & Water Management Section, United States Department of Agriculture, Billings, Montana

TVA FERTILIZER ECONOMICS SYMPOSIUM JUNE 14-16 – KNOXVILLE, TENNESSEE

Dr. Leland G. Allbaugh, director of TVA's Agricultural Relations Division, has announced that a symposium on Fertilizer Economics Research will be held in Knoxville June 14-16. Outstanding farm economists, agronomists, and statisticians will present and discuss papers dealing with various aspects of this kind of research which concerns itself with the economic value of various fertilizer materials to the farmer. Research workers from many states are expected to attend the conference to learn the latest techniques for such economic studies.

The following papers will be presented:

TVA and Fertilizer Development
Tennessee Valley Authority staff

Methodological Problems in the Study of the Economics of Fertilizer Use
Earl O. Heady
Department of Economics and Sociology
Iowa State College

A Comparison of Discrete and Continuous Models in Agricultural Production Analysis
Richard L. Anderson
Department of Experimental Statistics
North Carolina State College

Discrete Models With Qualitative Restrictions
Clifford Hildreth
Department of Agricultural Economics
North Carolina State College

Some Functional Models and Experimental Designs for Characterizing Fertilizer Response Curves and Surfaces
David O. Mason
Department of Experimental Statistics
North Carolina State College

Designing Experiments to Study the Economics of Fertilization
Glenn L. Johnson
Department of Agricultural Economics
Michigan State College

Practical Uses of Refined Fertilizer Response Estimates
William G. Brown
Department of Economics and Sociology
Iowa State College

Selecting Fertilizer Programs by Activity Analysis
Earl R. Swanson
Department of Agricultural Economics
University of Illinois

Organizing Fertilizer Input-Output Data in Farm Planning
Roger C. Woodworth
Department of Agricultural Economics
University of Georgia

Some Problems Involved in Fitting Production Functions to Data Recorded in Soil Testing Laboratories
Earl W. Kehrberg
Department of Agricultural Economics
Purdue University

Agronomic Problems in Securing Fertilizer Response Data Desirable for Economic Analysis
John T. Pesek
Department of Agronomy
Iowa State College

Designs for Research on Economic Use of Fertilizers in Conservation Farming
Earl O. Heady

Evaluating Generalized Estimates of Response to Fertilizer Using "Standard" Yield Curves
Donald B. Ibach
Agricultural Research Service
U.S.D.A.

Problems in Research With Fertilizer and Moisture Variables
W. Lawrence Parks
Department of Agronomy
University of Tennessee

Productivity Indices of Soil Mapping Units
Frank F. Bell
Department of Agronomy
University of Tennessee

Those interested in attending this symposium should address all inquiries to John Blackmore, Chief, Agricultural Economics Branch, Division of Agricultural Relations, Tennessee Valley Authority, Knoxville, Tennessee.

TVA PRODUCES AND FARM – TESTS DIAMMONIUM PHOSPHATE

EDITOR'S NOTE:

The recent news of TVA's plans to produce diammonium phosphate in plant-scale quantities has stirred many a reaction in the fertilizer industry, ranging from applause to condemnation. Some opponents of the plan have been outspoken to the point of calling for congressional opposition to the venture, citing the Budget Bureau directive which early this year declared that all agencies of government should take the proper steps to get out of all business-type activities not necessary to defense.

Nothing short of intervention by the President, an act certain to stir bitter echoes of the Dixon-Yates controversy, is likely to block the TVA program, since the agency has complete legislative authority and requires no funds for new production facilities from the pending budget.

Keen interest throughout the industry prompted your editors to contact J. H. Walthall, director of TVA's Division of Chemical Development, for this statement of the agency's production and distribution plans, along with a summary of background and goals.

General

The TVA Act of 1933 transferred to TVA the World War I government-owned nitrate plants at Muscle Shoals, Alabama, and directed their use to cheapen the cost of fertilizer to farmers by producing new and improved forms of fertilizer materials and to provide munitions for national defense. The Act further authorized TVA to distribute its fertilizers to demonstrate their use and the use of improved fertilization practices in agricultural development and soil conservation.

When a new fertilizer is developed in the TVA laboratory at Muscle Shoals, it is first tried out in greenhouse tests and on small field plots in research projects conducted by state agricultural experiment stations. If it appears promising, it is next introduced to farmers and is used by them in various farming systems to demonstrate its use under closely supervised conditions. This phase —the test-demonstration program—is conducted by the agricultural extension services and cooperating farmers. Finally it is introduced and demonstrated on a wider scale through educational sales programs. The educational sales program limits fertilizer to certain uses under less technical supervision than is the case in test-demonstrations. The program is conducted by selected distributors, both farmer cooperative and industry distributors. Depending on the nature of the material, the content of the educational program, and the response of farmers and other cooperators, the test-demonstration and educational sales programs may proceed simultaneously insofar as some certain uses are concerned. The nature of the educational sales program in each state is determined jointly by the land-grant college, the distributors of TVA fertilizer, and TVA, in cooperation with other agencies of the U. S. Department of Agriculture.

The output of the TVA fertilizer plant is but a small part of the national production—1½% of the tonnage and 3% of the plant nutrients in fiscal year 1954. However, the effect of this limited production of TVA fertilizer has been widely beneficial to both industry and agriculture. The results of TVA research and process development are available royalty-free to the industry and are being widely applied. Farmers are adopting better fertilization practices and improved farming systems and are demanding more economical sources of plant nutrients in increasing quantities. Two examples will illustrate the promotional effects of the TVA educational fertilizer program.

Twenty years ago concentrated superphosphate was not widely used. Farmers bought low-analysis phosphatic fertilizer almost exclusively. The industry was skeptical of the concentrated product and some college agronomists doubted that farmers would ever use it. In 1934 United States production of concentrated superphosphate was about 70,000 tons. TVA improved the process and product and began to demonstrate its uses through educational programs. Farmers began to use it. The annual output of this material by the fertilizer industry is now about 900,000 tons, exclusive of TVA production.

During periods of national emergency, TVA's chemical operations are diverted from its fertilizer development program to the national defense effort. For example, during World War II, in addition to supplying approximately 60% of the elemental phosphorus requirements of our armed forces, TVA supplied large tonnages of carbide, anhydrous ammonia, ammonium nitrate liquor, and ammonium nitrate crystals to the war effort.

After the military requirements were satisfied, TVA resumed its research and development work on fertilizers. In 1943, the use of ammonium nitrate as a fertilizer was almost unknown. TVA, its distributors, and the colleges introduced ammonium nitrate to farmers in a widespread educational and demonstration program. It is now a major source of nitrogen for direct application. In 1953, farmers used about 650,000 tons of ammonium nitrate, exclusive of the amount supplied by TVA.

The results of TVA experience with these major products offer assurance that similar benefits for both agriculture and industry can be gained through the introduction and demonstration of diammonium phosphate by TVA in a similar program.

Production

Diammonium phosphate is the latest high-analysis fertilizer material to be produced by TVA in plant-scale operations. This followed several years of laboratory and pilot-plant work on the process. It is the first multi-component fertilizer produced by TVA beyond the pilot-plant stage for use in the research and educational programs described above.

Diammonium phosphate is the most concentrated solid fertilizer yet produced in TVA plant-scale operations. It can be produced by the use of either electric-furnace or wet-process phosphoric acid. When electric-furnace acid is used, a material with a plant food content of 74 percent can be produced in a 21-53-0 analysis. One ton of this material contains almost as much plant nutrient as three tons of a mixed fertilizer of the average analysis now used by farmers. Because of its high concentration, diammonium phosphate offers an opportunity for

lowering the costs of plant food to farmers through savings in costs of transportation, bagging, handling, and spreading on the land, particularly in parts of the country that are distant from basic fertilizer raw materials.

As is the case with other TVA fertilizer activities, production and distribution of diammonium phosphate are designed to benefit present and potential producers and consumers of the material. Many of the problems encountered in going from pilot-plant to demonstration-plant operations will be solved, and this information will be available to the fertilizer industry. The product will be used in TVA's programs for the introduction of new materials so that best methods of use may be determined and potential markets may be fully developed.

TVA's production of diammonium phosphate does not involve a new plant. Some existing facilities have been modified which provide for a capacity of about 40,000 tons annually. **Actual tonnage produced will depend upon the amount which farmers will use in the educational programs for which it will be distributed.**

Initial production in fiscal year 1955 will be less than 5,000 tons for all program uses. Under conditions which can now be foreseen, about 20,000 tons will be produced in fiscal year 1956 for basic agronomic research, farm test-demonstrations, and educational sales. This compares with a potential market for commercial production of several hundred thousand tons annually.

Distribution

Diammonium phosphate will be used in all of the programs heretofore found effective in achieving introduction of new fertilizers and developing the best methods of their use. In spite of the apparent advantages of the material, its high cost per ton (because of its high concentration) may be a deterrent to farmer acceptance. Furthermore, the economics of the production and distribution of diammonium phosphate, in relation to alternative fertilizers, are such that **considerable work will be needed to determine the geographic areas and the agronomic uses in which the material produced commercially will be advantageous to farmers.**

Basic Agronomic Research

Results of experiment station tests of diammonium phosphate from pilot-plant operations have shown satisfactory crop response on test plots. They have further indicated that the physical condition of the product is satisfactory. Small quantities of the product will be used in more extensive tests conducted by the eleven experiment stations with which TVA has formal research projects and at stations in other states which want to include it in their fertilizer testing work.

Farm Test-Demonstrations

Diammonium phosphate will be used on test-demonstration farms in an intensive educational program under the supervision of the agricultural extension services of about 20 states. Its use in this program offers the best opportunity for rapidly acquainting county agents, land-grant college personnel, other professional agricultural workers, and farm leaders with the product. In this program, emphasis will be directed toward the following:

1. Demonstrating, on practical farms, the most advantageous specific uses for this product.
2. Determining and demonstrating the place of diammonium phosphate in complete fertilization programs under different systems of farming.
3. Evaluating the economic returns from use of diammonium phosphate under different soil and climatic conditions.
4. Obtaining farmer appraisal of crop response, storage behavior, and spreading qualities of the product.

Farm test-demonstrations involve close cooperation between the farmer and the extension service. Fertilization and crop systems are carefully planned, and detailed records are kept by the farmer in order that the results of his work may be adequately appraised.

Use in the Educational Sales Program

In addition to the more carefully supervised and reported use of diammonium phosphate on test-demonstration farms, the material will be used in educational sales programs worked out state by state among the land-grant colleges, distributors, TVA, and USDA agencies. Carrying the educational program to the farmers through the sales process is a distributor function, using information supplied by TVA and the colleges. Wholesalers will aid local dealers and farmers in how to use and handle the product and in exploring its adaptability for use in mixtures and in bulk spreading. Local dealers will gain experience in promoting demonstrations of the use of diammonium phosphate. In addition to gaining information from others, the farmers will supply information on their experience with the material.

Tests made to date demonstrate that diammonium phosphate can be used with little risk of unfavorable experience by farmers who buy it for presently known uses. In these cases close supervision of farming systems and the maintenance of detailed records are not required, as in farm test-demonstrations. The uses to which the material may be put will be limited. **Potential costs of diammonium phosphate commercially produced appear to favor its immediate use as a material for direct application in about half of the 35 states in which TVA now has educational sales programs with selected wholesale distributors.**

A portion of the product will go into high-analysis mixtures with potash and other materials to make recommended ratios of the three major plant nutrients. In areas where potash is required, the outlook for its use in high-analysis mixtures and in blending and bulk spreading operations is favorable. **Some of the material may be useful to dry mixers in upgrading the mixtures they are now able to produce with their limited equipment, thus enabling them to lower the cost of plant nutrients.** Mixers will be permitted to use it in this way only if the resulting product contains a plant food content of at least 40%. Deviations below this percentage may be made to fit particular conditions.

Distribution and Pricing Policy

Diammonium phosphate will be made available for distribution in any state now having a cooperative educational program with TVA

REPORT ON A HIGHLY CONTROVERSIAL SUBJECT

where the material is suitable for use and where it could economically be supplied by a potential commercial producer. Present plans provide for TVA production of diammonium phosphate for about five years, depending upon results obtained on the farms and upon how quickly industry makes efficient use of this process.

TVA prices for diammonium phosphate will be related to the estimated costs at which the product could be made by efficient commercial producers operating under favorable conditions, including plant location and availability of economical sources of raw materials. TVA prices will be close to those which might be charged for the product of such commercial producers, with only such price reduction from this base as is necessary to encourage distributors and farmers, who would not otherwise do so, to use this new product.

Preliminary estimates of production costs at favorable locations indicate that commercial producers with an economical source of ammonia and phosphoric acid could sell diammonium phosphate at about $120 per ton of material, f.o.b. such locations, with a margin for profit. Because of the educational program in which the material will be used, the resale price, or the price at which this material leaves the TVA plant for delivery to wholesale purchasers, is set at $110.49 a ton, bagged, f.o.b. Sheffield, Alabama. In some cases slight deviations are made from this price for services rendered. This price is well above TVA's cost of production.

Relationship to Other Producers

According to available information there are three producers of diammonium phosphate for fertilizer use, one located in California and two in Colorado. These have come into operation only recently. Their probable combined sales for calendar year 1955 are understood to be about 30 or 40 thousand tons. Besides these, two producers of diammonium phosphate for food and chemical uses are located in Illinois and Michigan. It is understood that these firms sell diammonium phosphate in small quantities for use in high priced fertilizer specialties, such as transplanting solutions.

The differential between prices for TVA diammonium phosphate and the prices of the potential commercial producers is occasioned by the education and demonstration objectives of the fertilizer program. In the case of ammonium nitrate, where a differential also exists to promote fertilizer education, the use of commercial ammonium nitrate has steadily increased, and TVA is confident that experience with diammonium phosphate will be equally favorable. Although this material does not offer possibilities nationally that are comparable to ammonium nitrate and concentrated superphosphate, it should develop an ultimate market of several hundred thousand tons annually.

Development of this market should generate new commercial production of diammonium phosphate which will provide new opportunities for the use of byproduct ammonia and an additional outlet for phosphoric acid. Many present producers of byproduct ammonium sulfate, a relatively low concentration fertilizer whose use is declining, can readily convert their facilities to make this new product.

Demonstration - scale production and distribution by TVA will expedite the ultimate and economical development of the process for the benefit of many segments of industry and many farmers.

CF Staff—Compiled TONNAGE REPORTS

FERTILIZER TONNAGE REPORTS (in equivalent short tons)
Compiled by COMMERCIAL FERTILIZER Staff

State	April		March	Jan.-Feb.-Mar. Quarter		July thru December		Year
	1955	1954	1955	1955	1954	1954	1953	1953-54
Alabama	244,382	290,323	315,766	433,542	498,391	267,041	147,702	1,087,763
Arkansas	72,578	88,979	81,579	134,588	166,326	59,887	52,438	366,225
Georgia	377,103	396,331	181,966	328,956	385,809	225,083	218,027	1,361,254
Louisiana	55,314	63,691	85,771	123,971	140,513	67,832	84,706	316,757
Missouri	.....	119,757[1]	120,206	189,351	273,137	268,257	256,427	756,457
N. Carolina	451,785	454,470	85,771	123,971	140,513	67,832	84,706	316,757
Oklahoma	.....	14,149[1]	17,212	35,770	41,182	58,406	71,558	144,367
S. Carolina	156,388	107,183	327,676	521,731	591,731	132,604	183,919	939,678
Tennessee	88,416	96,124	47,929	63,463	83,633	167,383	107,544	523,300
Texas	63,947	72,893	120,936	214,995	205,622	212,885	186,097	562,530
California	(reports submitted quarterly)			283,155	214,105	318,270	317,270	830,327
Virginia	(reports submitted quarterly)			287,367	305,316	159,185	160,715	780,931
Indiana	(reports submitted semi-annually)					285,673	283,987	1,180,091
Kentucky	(reports submitted semi-annually)					91,386	88,905	577,905
New Jersey	(reports submitted semi-annually)					53,830	57,928	289,614
Washington	(reports submitted semi-annually)					58,162[1]	*	*
TOTAL	1,509,913	1,569,994	1,813,355	3,442,486	3,769,438	2,632,227	2,474,080	11,532,795

.....(not yet reported) * Not compiled [1] Omitted from column total to allow comparison.

MARKETS

ORGANICS: Producers of fertilizer organics are already in heavily sold positions through several months into the fall. One producer of Leather Nitrogenous is sold out through December. The Castor Pomace producers are sold out through July/August and are not offering beyond that.

Leather Nitrogenous Tankage from the 2 major producers is indicated at $4.50 and $4.75 per unit of Ammonia, bulk, f.o.b. production point.

CASTOR POMACE: Except for possible imported supplies which are expected to be very limited, there probably will be only two sources in the Eastern United States from which supplies can be obtained for the coming season. These supplies are expected to be quite limited compared to previous years and the current price is nominally $37.50 per ton in bags, f.o.b. Northeastern production points. Due to withdrawal of support by the Government of the Castor Beans in the Texas/Oklahoma area, it is rather doubtful any Castor Pomace supplies will be available from that area during the coming season. The Government has announced it has reached its strategic stockpile objective on Castor Oil which is probably the cause for the expected reduced production by the Eastern producers of Castor Pomace.

DRIED BLOOD: The Chicago market is currently reported at around $5.00 per unit of Ammonia and the New York market approximately the same for unground Blood in bags. These prices are the result of weak demand from the feed trade which normally supports higher prices on Blood.

POTASH: Buying interest is relatively dormant at present for current

supplies and one of the domestic producers has announced its new season's price at 36½¢ per unit K20, bulk, f.o.b. Carlsbad, New Mexico, for contracts negotiated prior to July 1st for approximately equal monthly shipments. For contracts negotiated after July 1st, price is 40¢ per unit K20 f.o.b. Carlsbad on Muriate of Potash. This represents an increase over the previous season's list price.

GROUND COTTON BUR ASH: Movement of this source of Potash, primarily in the form of carbonate of Potash, continues steady and supplies adequate to meet the demand. Current analysis varies from 38% to 41% K20 allowing for the material to deliver at approximately the same cost as domestic Sulphate of Potash.

PHOSPHATE ROCK: Supplies continue adequate to supply domestic consumers and movement is quite seasonal.

SUPERPHOSPHATE: Fair stocks are on hand in most areas of the country. Prices are steady in general.

AMMONIUM NITRATE: Demand is tapering off and supply appears to be adequate with prices steady.

NITRATE OF SODA: Demand continues good for direct application purposes and volume is expected to equal to or possibly exceed last season's use. Price continues at $51.25 per ton in bags, f.o.b. the cars at port for Import material and domestic price is $43.50 per ton, bulk or $47.00 per ton in bags, f.o.b. works.

GENERAL: Seasons in most of the parts of the country are nearing an end and contracts for various raw materials will soon be made for new season's supplies. Indications are that most materials, with the possible exception of organic ammoniates, will be in adequate supply but it appears that organic ammoniates will be tighter in supply and higher in price.

Farmers Borrow $11,881,000 For Conservation

During the first seven months of the Farmers Home Administration's new soil and water conservation program, 2,195 farmers and ranchers borrowed $11,881,000 to improve their soil and water resources, the U. S. Department of Agriculture announces.

In addition, county offices throughout the country have reported to the agency's administrator, R. B. McLeaish, that they are processing loans totaling $3,224,000 and are receiving applications at the rate of approximately 300 a week.

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Soil Scientists Favor Change in Reporting Fertilizer Analyses

A new and simplified method of labeling fertilizers has been endorsed by American soil scientists represented in the Soil Science Society of America.

The Association reports on it as follows: "In a recent mail ballot, 95 percent of them voted in favor of a proposed change in reporting the plant nutrient content of commercial fertilizers, soils and plant materials. This change would require us to state the content of all plant nutrients in the elemental form—as is now true with nitrogen—rather than the oxide form now used for phosphorus, potassium, and certain other nutrient elements.

"The use of the oxide form of reporting the composition of fertilizers, soils and plants, appears to be a hang-over from the method of rock analysis employed over a century ago. Early chemists used the oxide mode of reporting these analyses so as to give a total of 100% for a complete analysis.

"The persistence of this method, which reports potassium as K_2O and phosphorus as P_2O_5, is mainly due to the survival of chemical terminology developed and put into use 100 or more years ago, according to a leading British soil scientist. The problem of changing to a simplified system has received more attention in some European countries than it has in the United States. However, various conferences of American agricultural scientists have, over the past 30 years, concluded that there is no valid scientific reason for using K_2O and P_2O_5 in place of P and K, respectively.

"The failure to adopt a uniform method of showing the nutrient content of fertilizers, soils and plants has led to much confusion in both popular and technical literature. Even some well-known agricultural scientists have contradicted themselves within a single sentence or paragraph.

"Advantages claimed for the elemental method of reporting fertilizer guarantees and soil and plant analyses are these:

(1) There would be greater uniformity in expressing nutrient content, with much less confusion all around.

(2) This method is already well established in animal nutrition and in the feed industry.

(3) Most soil tests are already expressed on the elemental basis, as is the nitrogen content of fertilizers, soils and plants.

(4) The change would simplify terminology for both the technician and the farmer. As we all know, the simplest way is usually the best way—other things equal.

(5) The matter of expressing fertilizer ratios would be much more accurate and straightforward if done on the elemental basis. Under the present system, a fertilizer ratio of 1:2:0 implies that twice as much phosphorus as nitrogen is being used. Actually, the ratio is only 1:0.88:0—when all nutrients are expressed on a uniform elemental basis.

"Naturally, there have been objections voiced by those who would oppose such a change. Some people claim the new system would create an impression of lowering the "plant food" content of fertilizers and, for those who have no knowledge of chemistry, it might seem like less nutrient per dollar invested. However, the new elemental system is simpler and more logical, hence easier to explain to those really interested in the problem. Most soil scientists agree that this objection can be overcome in short order. However, there are some valid objections, particularly the following:

(1) The oxide method has been in use for so long than any new system would require an intensive educational effort to acquaint all groups with it.

(2) Our present fertilizer laws would require revision. This would have to be coordinated on a national scale.

(3) Costs in making any kind of a change are invariably passed along to the consumer—in this case, the American farmer.

(4) A complete revision of fertilizer grades and formulas would be needed."

New Standard Building By McCloskey Company

A new standard prefabricated building called "Design 12" was announced May 16 by the McCloskey Company of Pittsburgh, engineers and builders, which Robert F. McCloskey, president, said "represents a new concept in design and is our exclusive product."

"Design 12 was produced out of long research to be competitive with any other standard structure marketed," he added. "We feel that it will guarantee better, longer-lasting cover for any operation at less cost. Over a period of many years we have been applying our experience in rigid frame construction to research for the improvement of standard, prefabricated buildings. This research, in our opinion has made it possible to market what we consider a truly better building.

Initial economy, easy expansion in length or width at low cost, and long-term maintenance savings are said to be among the advantages of the new McCloskey building.

Referring to the competitive economy of his company's "Design 12" structure, Mr. McCloskey emphasized that "our engineers were unwilling to sacrifice the proven superiority of hot rolled steel to achieve low cost. Economy was achieved by designing the frame to produce the maximum of efficiency per pound of steel weight.

Design 12 is offered as another basic contribution to the building field by the Pittsburgh firm whose patented Rigidsteel building registered a claimed "first" in making rigid frame buildings competitively economical and versatile. According to the designers, McCloskey standardized buildings—both the earlier Rigidsteel and today's "Design 12"—embrace all important features of custom buildings.

Shipment is made direct from fabrication plants at Ambridge, Elmira, Trenton, Gary, Memphis, Minneapolis, Birmingham, Roanoke and Pittsburgh.

A horizontal vibrating screen of completely new design has been added to Link-Belt Company's line of screening equipment. The new screen—known as Straightline—is especially suited for dewatering high capacity loads and sizing of material where headroom is limited. It has a much lower silhouette, although all advantages of high-intensity straightline action are retained.

The Link-Belt Straightline screen has two vibrators, one mounted on each side of the screen at deck level for ease of inspection. Both are located at the center of gravity, so that uniform vibration is assured. They do not project above the sideplates; thus headroom is held to a minimum. Straightline screens are available in sizes from 4 by 8 ft. to 6 by 20 ft. with either one or two decks. Dimensions for the complete line are available on Data Sheet 2562 from Link-Belt Company, Dept. P-R, 307 N. Michigan Ave., Chicago 1, Ill.

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Safety

Safety Section Plans For Fall Meet

The Fertilizer Section of the National Safety Council is busily at work preparing for the meetings to be held in Chicago October 17 and 18.

Curtis A. Cox, vice-chairman of the Section, who is assembling the meeting data, has so arranged the program so as to have a different type of program each day. This is the year in which the motivation study for the industry sponsored by the Fertilizer Section has been underway. Because of this, the committee has chosen to have as the general theme for the first day "The Human Aspect of Safety."

To properly introduce this program, Max W. Foresman, Director of Public and Plant Relations of Spencer Chemical will address the group on safety and human relations. Following this talk, Dr. Charles W. Nelson of the University of Chicago will give a report of the motivation study which he is currently conducting in the fertilizer industry.

P. W. Logan, Division Manager of the Liberty Mutual Insurance Company in Atlanta, Georgia, will give an illustrated lecture. His title will be "Selling Safety or Management and Supervision's Part in Loss Prevention."

The last portion of the program on the first afternoon will be open for panel discussion and will be called "Views and Interviews."

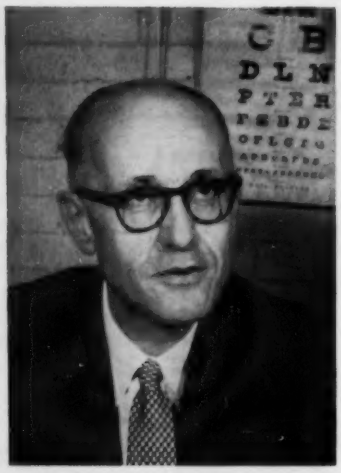
Mr. Cox indicates that at this time it is hoped that the committee will be able to get an abundance of ideas from those present which will be helpful in planning the progress of the Section.

On the second day, the program will be given essentially to panel discussions.

Particular emphasis is being placed on the fact that there will be informal group sessions during the interim between the afternoon sessions of the 17th and the afternoon sessions of the 18th. It is the present plan of the committee for the members of the panel to lead these informal sessions with the individuals who have indicated interest in respective subjects.

The committee is desirous of doing everything possible to have a full and free exchange of ideas and to assist in any way possible those attending the Section meetings who have comparative problems in their respective plants. This type of meeting will enable many of the supervisors attending to get specific answers to the safety problems at their location.

Mr. Duncan MacDonald, Safety Engineer for the Anaconda Copper Mining Company, will have a display of mechanical guards and will give a paper on this subject.



George L. Pelton, Smith Agricultural Chemical Co., who has been appointed chairman of the Insurance Advisory Committee of the Fertilizer Safety Section.

Safety Award To Simplicity Engineering

"Let's think in terms of Human Scrap as well as material scrap," was an employee's comment that became a safety theme, resulting in the recent safety award presented to Simplicity Engineering Company, Durand, Michigan, for its remarkable safety record.

In a contest covering metal fabricating plants throughout the country and sponsored by Michigan Mutual Liability Company, Simplicity Engineering was awarded second place. The award is even more significant when it is realized that during the calendar year 1954 Simplicity employees worked 384,080 hours with only two minor accidents resulting in only 19 days lost time. This is the largest number of hours worked by any of the participating companies and is over three times the number of hours worked by the winner.

Simplicity has an accident frequency rate of only 5.2 (per million hours worked), while the national average for all industries is 14.7.

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ARIZONA

Southwestern Agrochemical Corp., which plans to build a $2,500,000 ammonia plant in Salt River Valley, is now selling stock and expects to start construction some time this summer. Shares represent a proportionate ownership of all equipment, land and other assets in a nonprofit corporation and shareholders will buy output at cost. The plant is expected to produce 25 daily tons of anhydrous and aqueous ammonia to start, and plans are to permit expansion to 50 daily tons if demand warrants. This is the first ammonia plant in Arizona.

Officers are: **J. Clyde Wilson**, chairman; **E. C. Harney**, president; **Fred W. Lauer, Jr.**, vice-president; **Richard L. Wells**, secretary-treasurer. **R. R. Oliver** is to be sales manager.

CALIFORNIA

Haas Ammonia & Fertilizer Co. is the new name of the former **C. H. Haas Co.**, Modesto, since they have added anhydrous ammonia to their dry fertilizer business. All personnel will continue in present capacities and the office remains in the same location.

FLORIDA

A new corporation, **Baltimore-Florida Company**, with offices at Miami Beach has been organized to process phosphate reserves into phosphoric acid, with by-product uranium ore and limestone recovery. **J. K. Shinn**, Miami, is president and general manager of the firm, and **F. E. Snow**, Ocala, is vice president in charge of field operations.

Plans call for development of deposits in Levy County, Fla. with a pilot plant to be set up near Otter Creek later this year, and a 66-tons-per-day phosphoric acid facility to follow in 1956. Uranium recovery is slated as an integral part of the processing unit.

Explorations are also under way by the new company as to the feasability of extracting potash content of slate deposits in Bartow County, Ga. Samples of this material have been analyzed at 5 to 9% and higher in K_2O content. Tentative plans call for financing a pilot plant operation to acidulate the slate with nitric acid, extracting approximately 65% of the potash it contains.

More than 100 civic and industry leaders in Northwest Florida joined officials of Escambia Bay Chemical Corporation in officially breaking ground for the firm's petrochemical plant now under construction between Milton and Pensacola. Cost of the plant including other facilities to be built later will exceed $25 million. Pictured here with Escambia Bay President M. A. Abernathy (center) are E. L. Stokes (left), chief accountant, and A. J. Bruno, chief engineer for the newly-organized company.

GEORGIA

D. Olin Franklin and **John Ed Brannen**, for some years distributing anhydrous ammonia from Claxton in association with **Herman C. Odom** have now set up a distribution point in Statesboro, while retaining their Claxton connections.

IDAHO

Central Farmers Fertilizer Co., representing 16 mid-West cooperatives expects to start early next year on construction of the 35,000 KVA electric furnace at Georgetown Canyon, near Montpelier, for the production of elemental phosphorus, at a cost of $10,000,000. Only contracts for electric power have stood in the way.

ILLINOIS

Chemilizer Corp., went into production recently at Springfield, with 50 daily tons of analysis liquid fertilizer. Final capacity is slated to be 300 daily tons, and will be distributed via both tank car and truck. Officers are: **Carl Carter, Sr.**, Chairman; **K. G. Cole**, president; **E. A. Purnell**, treasurer; **James W. Sheldon**, secretary.

* * *

Mavco Fertilizer Co. has been chartered at Springfield and authorized to issue 10,000 shares of $10 stock. **Mary Elizabeth Quinn, Norman P. Jones** and **George K. Blanchard** are incorporators of record

INDIANA

Shea Chemical has moved its offices from Baltimore to Jeffersonville, where permanent quarters have been built. They are opening a New York office at 114 East Fortieth Street, establishing an organic phosphates division at Adams, Mass. and expect by the end of this month to have completed plans for a new 20 ton elemental phosphorus furnace in Columbia, Tenn. to cost around $2,000,000.

IOWA

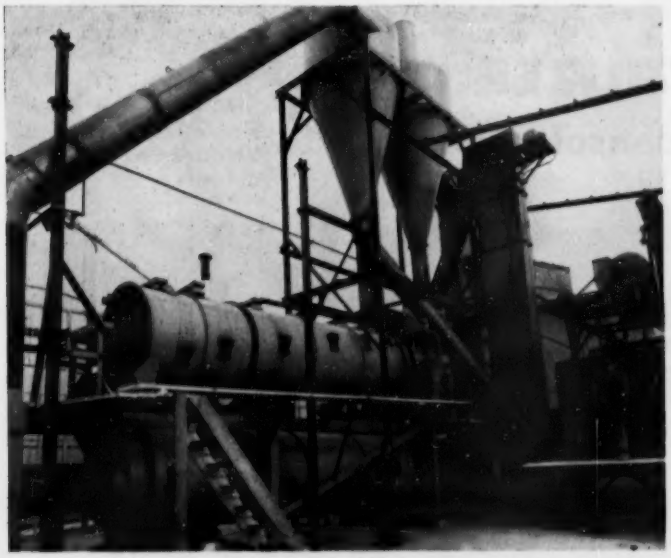
Vorhes Chemical Corporation, Charles City, is a $200,000 corporation formed to manufacture fertilizer in a building already purchased for the purpose. General manager is executive vice-president **Harold Vorhes** of Dubuque, 35 years in fertilizer, who has resigned from **Virginia-Carolina** as of June 1. **Ralph W.**

Zastrow, attorney, is president.

The plant, which is expected to be in operation by September 1 will produce both bulk and bagged fertilizer on equipment to be furnished by **Stedman.**

Chemical Enterprises, has acquired three Iowa companies, distributors of anhydrous ammonia: **Radco Fertilizer,** Essex, and its affiliates, **Radco-Eastern** and **Radco-Creston,** operating a total of 10 stations.

Shot at the new plant of The Farm Chemical Co., Longmont, Colorado, which has been set up as a completely modern operation with Stedman basing and bagging mills and a Blue Valley Fertilizer Granulator. All equipment was furnished by Blue Valley Equipment Manufacturing and Engineering Company of Topeka, Kansas. With the corn planting well under way, shipments started immediately. Sugar beets, however, are the main crop of the area.



When completed a year from now Indiana's first nitrogen products plant will be the largest in the U. S. producing anhydrous ammonia from oil refinery by-product hydrogen—University plant foor experts and officials of Calumet Nitrogen Products Company break ground in mid-May for a new plant capable of producing 300 tons of anhydrous ammonia a day at Hammond, Ind. Pictured are (left to right): Dr. Roger H. Bray, University of Illionis agronomist; E. W. Griscom, vice president, and J. H. Forrester, president, Calumet Nitrogen Products; Mayor Vernon Anderson of Hammond, and Dr. A. R. Bertrand, Purdue University agronomist.

Kay Dee Feed Company, Sioux City, has begun production at its liquid fertilizer plant, which has a capacity of 50 daily tons.

KENTUCKY

Kentucky Farm Chemicals and Service Company, has been chartered at Louisville to manufacture and deal in fertilizers and crop chemicals, with a $250,000 capitalization. Incorporators are **Robert J. Williams, Larrie W. Williams, W. Wilson Branch** and **James B. Andrews.**

MAINE

Northern Chemical Industries, Searsport, Maine has announced placement of contract with **Leonard Construction Company** of Chicago, Illinois for its second Monsanto type contact acid plant. **J. E. Totman,** president, stated the plant will have a rated capacity of 100 tons per day of 100% sulphuric acid. Combined with its present plant, N.C.I. will have a total rated daily capacity of 170 tons, with actual up to 220 tons. Tank storage will be increased to 4,000 tons. This added acid capacity is necessary to provide for N.C.I.'s increased chemical business which includes liquid alum for the pulp and paper industry, superphosphate and sulphate of ammonia for domestic and export agricultural needs.

The plant will reflect Leonard's latest design and adjoin the present unit built in 1943 at Kidders Point, Searsport, Maine. Completion is scheduled for January 1, 1956, preceding by about sixty days N.C.I.'s completion date for its 125 ton per day anhydrous ammonia and nitric acid facilities now being constructed by the **Girdler Company** of Louisville, Kentucky. Upon completion of this plant, N.C.I. will be the second largest producer of sulphuric acid in the New England states and will have a crude sulphur requirement of about 25,000 tons per annum.

Cost of the new Acid facilities will increase N.C.I.'s investment in its chemical center at Searsport by some $650,000, bringing to a total of ten million dollars the Company will invest in new facilities during the 1955-1956 period.

MARYLAND

Miller Chemical & Fertilizer, Baltimore, expect this month to occupy the former **Bradley & Baker** feed plant which they have converted into a dry mix fertilizer operation. The concern now operates both crop chemical and fertilizer plants in Baltimore, and branch plants at Salisbury and Whiteford, and at Hanover, Pa.

Serving farmers in Central and North Central Alabama with Ballard Brand Fertilizer is the Clanton Fertilizer Company of Clanton, Alabama. The company has just completed an addition which increases the plant storage space by one-third.

C. W. Ballard is president of the Clanton Fertilizer Co., Clanton, Alabama.

CLANTON FERTILIZER CO.

. . . Another Spensol User

Here is some of the modern equipment used by Spencer to produce SPENSOL Nitrogen Solutions for some of America's leading fertilizer mixers.

On time deliveries of SPENSOL solutions have helped to build Spencer's reputation for dependable service to mixers throughout the country.

New kind of solution injector, giving better ammoniation of mixed fertilizer, was invented by H. B. Davis of Spencer Chemical Company staff.

SPENCER

SPENSOL CHEMICAL COMPANY, Dwight Bldg., Kansas City 5, Mo. District Sales Offices: Atlanta, Ga.; Chicago, Ill.; Memphis, Tenn.; Works: Pittsburg, Kans.; Henderson, Ky.; Chicago, Ill.; Vicksburg, Miss.; Orange, Texas.

America's Growing Name in Chemicals

MICHIGAN

American Agricultural Chemical is reported having bought a 40 acre site at Kalamazoo for a fertilizer plant.

NEW YORK

Shell Chemical Corporation, effective June 1, has moved its crop chemical unit, responsible for sales of Aldrin, Endrin and D-D from Denver to New York City. The new address is 460 Park Avenue, the new phone Plaza 5-5401.

NORTH CAROLINA

Dixie Fertilizer Company, lost some 20 tons of mixed goods when fire destroyed a warehouse in Goldsboro operated by **O. L. Littleton,** fertilizer agent.

OHIO

Miami Fertilizer Company is, of course, in Ohio and not in Oklahoma as we inadvertantly placed them in April. **Russell Martin,** president, would like also to have us report that Dayton 10 is his postoffice address though the plant is in Trebeins, and his phone is Xenia 2-4467. He adds that the granulation equipment we reported last month is the **Blue Valley System** as developed by **Wendell P. Glaspey.**

TENNESSEE

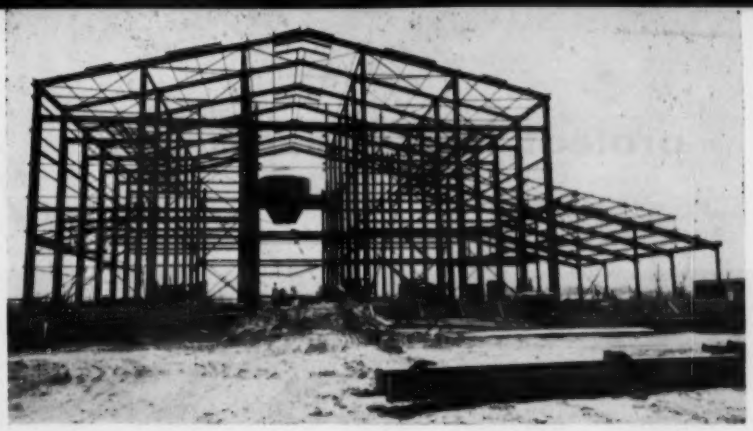
Grace Chemical Company headquarters are being transferred from New York City to Memphis, according to an announcement made May 6 by **Charles E. Wilson,** Chairman of the Board.

Declaring that the change was being made in the interest of greater operating efficiency, Mr. Wilson noted that the move was also motivated by "the excellent facilities offered by Memphis, which is the center of our Mid-South marketing area."

William J. Haude, formerly vice president in charge of marketing, will be in charge there as vice president and general manager. **John G. Carriere,** presently plant manager of the ammonia-urea plant located at Woodstock, near Memphis, has been named vice president and plant manager.

Plans to increase the local plant's ammonia capacity and additions of new process plants are under consideration.

At the same time the establishment of a new division of **W. R. Grace & Co.** to spearhead anticipated further expansion in the chemical manufacturing and processing fields, was announced.



Progress is being made in the construction of the new Sims Plant of The Farm Bureau Cooperative Association at Mt. Gilead, Ohio.
This plant when completed will have an annual tonnage of some 70,000 tons of granular fertilizer mixed goods is scheduled to be ready for initial operation about mid August. The A. J. Sackett & Sons Company of Baltimore, are prime contractors for this project.

The new organization, to be known as the **Grace Chemical Research and Development Company Division,** will be headed by **William P. Gage,** formerly president of **Grace Chemical Company. Elwyn E. Winne** will be vice president.

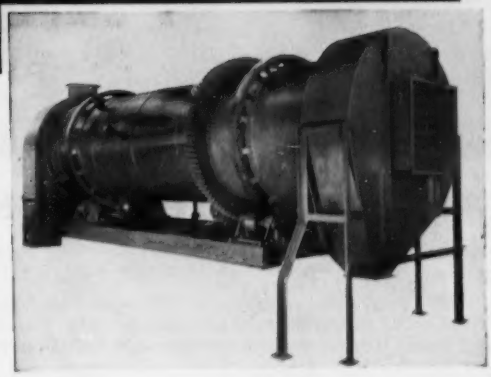
The new division will study new opportunities, generally in the chemical field.

"The new division will be responsible for many chemical projects now in the study and planning stages," according to Mr. Wilson. New urea derivatives are under study, he revealed.

* * *

Geigy Chemical has established a distribution branch in Chattanooga,

COOLERS



For All Materials

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- Metals
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One of a battery of 5 Renneburg coolers, specially designed and manufactured for fertilizer plants located in Iowa, Maryland, Michigan, Ohio and Tennessee. Each unit handles 25 tons per hour . . . incorporates highly efficient shelf design for quick thermal release, with special feed and discharge breechings. Coolers rotate on large steel trunion wheels equipped with self-aligning, anti-friction bearings. Rotary seals prevent air losses. For Dryers and Coolers tailored to your specific needs, contact Renneburg—pioneer dehydration engineers and manufacturers for over 75 years.

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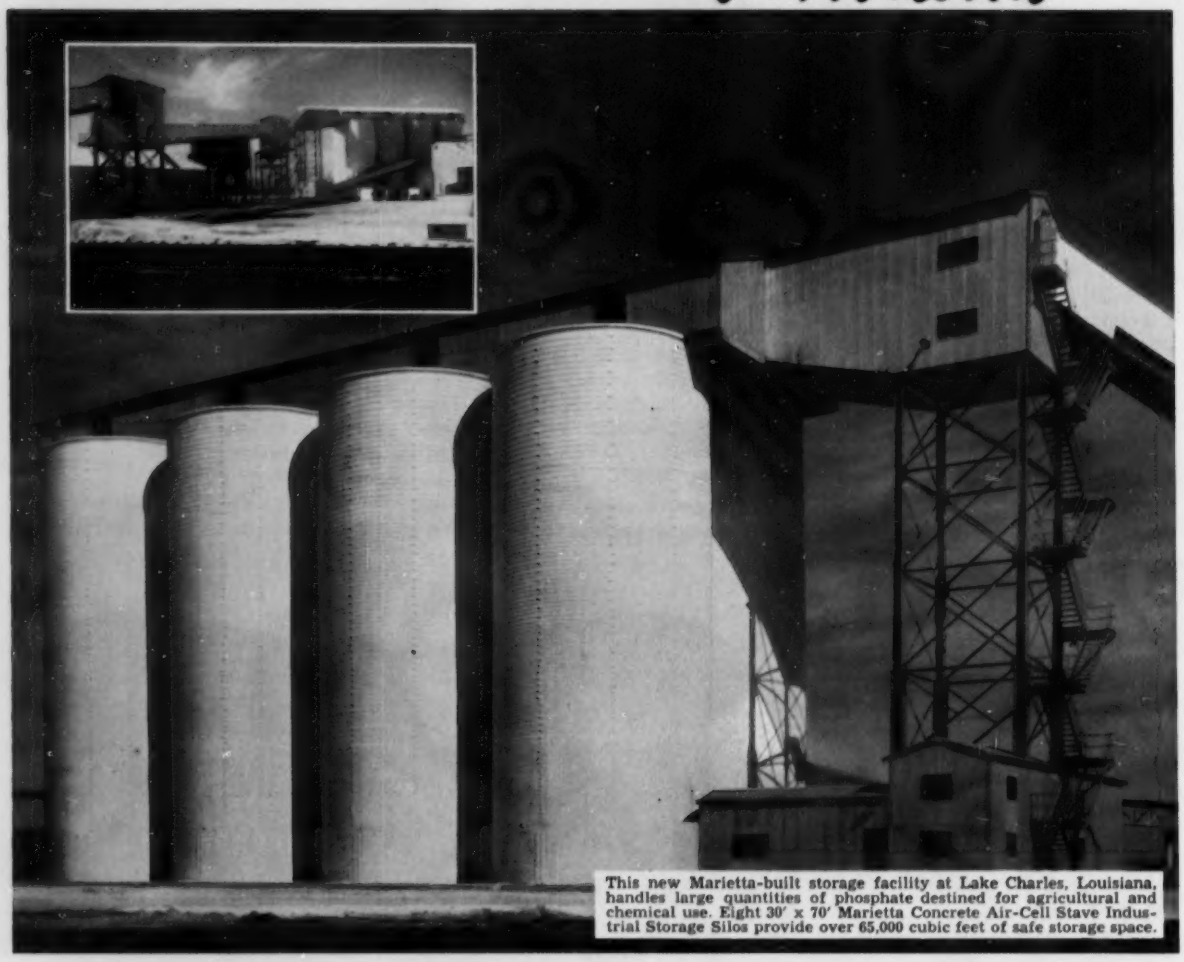

This new Marietta-built storage facility at Lake Charles, Louisiana, handles large quantities of phosphate destined for agricultural and chemical use. Eight 30' x 70' Marietta Concrete Air-Cell Stave Industrial Storage Silos provide over 65,000 cubic feet of safe storage space.

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where they will construct a $100,000 building.

TEXAS

Southwest Fertilizer and Chemical, El Paso, have added packaged lawn fertilizers to their line, at present the goods are only in 50 pound packages of 14-7-0. The concern, whose general manager of **W. G. Nelson,** occupies a $500,000 plant built two years ago, and produces both fertilizers and crop chemicals, and is a distributor for nitrogen solutions, and Nitro-Sul a combination soil conditioner and plant food, which has previously been reported on here. Their unusual trade names will be remembered: SWFGRO for fertilizer; SWIFKILL for pesticides.

UTAH

Greener Plant Food Co., Ogden, a division of **Producers' Livestock Marketing Assn.,** is now in operation in a plant costing around $75,000 and set up for 50 daily tons of mixed fertilizer. **Ralph C. Drake** is salesmanager.

VIRGINIA

Smith-Douglass' Money Point plant recently entertained members of the **Tidewater Turfgrass Association.** The greenskeepers among them are reported to have been especially interested in fertilizers for golf courses.

WEST VIRGINIA

DuPont has announced "Uramite" a "completely new fertilizer material which will release adequate nitrogen continuously and uniformly throughout the growing season." Developed by their polychemicals department, the new product is being made at their new plant at Belle. Uramite is a mixture of methylene ureas, almost completely water-insoluble, which dissolve in the ground at a rate conformable with moisture and temperature. It will be marketed now to turf and ornamental plant professional growers.

WISCONSIN

Rockton Fertilizer Co. has been organized in Madison, with 2,000 shares of $10 common.

CANADA

Consolidated Mining & Smelting now has its Calgary plant in operation. Capacity is in excess of 50,000 annual tons of ammonia.

FINLAND

Oulu Saltpeter Co., which is a state-owned facility producing 16,000 annual tons of nitrate fertilizers, is expanding on funds borrowed from West Germany. The Finnish government has guaranteed repayment. The new financing is for equipment to double present production, which will make Finland virtually independent of imports.

INDIA

Sindri fertilizer plant's new administration building has been launched, with President Rajenra Prasad laying the foundation stone last month. A new plant is to be established to produce fertilizer from the coke oven exhaust gas, and to make cement from the residue of the coke used to make ammonium sulphate, both of which are now going to waste.

ISRAEL

The Minister of Development, Dov Joseph, has announced that a plant will be established to produce organic fertilizer from the rich deposits of peat in the Hule swamps in upper Gallilee.

MEXICO

Stauffer de Mexico, S.A., subsidiary of Stauffer Chemical Co. has announced the opening of an administrative office for Eastern Mexico at Edificio La Nacional, Despacho 411, Monterrey, N.L. Mexico. Also announced was the construction of a new insecticide plant at Reynosa, Tamps. Stauffer de Mexico, S.A. manufactures insecticides also at Nogales, Sonora on the West Coast of Mexico. The new plant at Reynosa will replace the present smaller facility at Rio Bravo, Tamps.

PUERTO RICO

Gonzales Chemical Industries, Inc. San Juan, have completed financing plans for a $12,250,000 anhydrous ammonia plant and other integrated facilities, according to **Luis R. Gonzales,** president. The anhydrous ammonia plant is designed to turn out 42,000 annual tons. **The Lummus Co.,** New York, is designing and will construct the plant. **Cox & Weinrich,** Washington, are consulting engineers for GCI.

VENEZUELA

Hrant Adjemian, head of an importing firm in Caracas, is sponsor of a plant to build 5 plants in Venezuela to convert household refuse into organic fertilizer by a zymothermic process. The total of the plants would be around $3,700,000 and they will be installed soon, 2 in Caracas, one each in Maracaibo, Barquisimeta and Valencia. They expect to sell output at $30 a ton, at which figure they assert a net profit of 30-35% will be yielded.

INDUSTRY CALENDAR

Date	Organization	Place	City
June 13-15	NFA-APFC	Greenbrier Hotel	White Sulphur Spgs.
June 21	Western Ag. Chem. Assn.	Clark Hotel	Los Angeles, Calif.
June 22-24	Sou. Fert. Control Officials	Jung Hotel	New Orleans, La.
June 28-30	Pacific N.W. Conference	Boise Hotel	Boise, Idaho
July 5-8	E. Canada Plant Food	Bigwin Inn	Muskoka, Ont.
July 14-15	Southwest Grade Hearings	Buccaneer Hotel	Galveston, Texas
Aug. 14-19	Agronomy, Soil Science	Univ. of Calif.	Davis, Cal.
Sept. 7-9	Nat'l Ag. Chem. Assn.	———————	Spring Lake, N. J.
Oct. 17-18	Fertilizer Safety Section	La Salle Hotel	Chicago, Ill.
Oct. 27	Middle West Soil	Sherman Hotel	Chicago, Ill.
Nov. 2-3	Pacific N.W. Plant Food	Pilot Butte Inn	Bend, Oregon
Nov. 7-8	California Fertilizer Assn.	Mark Hopkins Hotel	San Francisco, Cal.
Dec. 5-7	Ag. Ammonia Institute		Kansas City, Mo.
	1956		
Jan. 4-6	Weed Society of America	New York Hotel	New York, N. Y.
Feb. 15-17	Western Weed Control Conf.	Univ. of Calif.	Davis, Calif.

Cotton Conference Slated For December

The first annual Beltwide Cotton Production Conference will be held December 15-16 at Hotel Peabody in Memphis, the National Cotton Council announced recently.

This represents an integrated approach to four major production problems—insect control, defoliation, chemical weed control, and disease control. Previously, the Council has sponsored separate conferences on all these problems except disease control.

The new meeting will highlight specific jobs that farm chemicals can do in cotton production, but its scope will be broad enough to cover interrelationships between chemicals and all other production factors.

Attending will be research and education workers from land grant colleges, USDA, and vocational agricultural, as well as representatives of commercial firms concerned with manufacturing, distributing or applying farm chemicals.

SURVEY OF FERTILIZER–PESTICIDE MIXTURES USED ON FOOD CROPS

Conducted By
RODNEY C. BERRY
Virginia State Chemist

A comprehensive new study of regulations governing fertilizer-pesticide mixtures for food crops in the U. S., Hawaii, Puerto Rico and Canada has just been completed by Rodney C. Berry, Virginia State Chemist and active participant in the affairs of the Association of American Fertilizer Control Officials.

A similar survey which he made in May, 1954 was received very favorably by fertilizer control officials, experiment station workers, and members of the fertilizer and pesticides industries. The current survey boasts exceptionally good response from state officials, with rather complete information received from almost every one; this data will be used as a basis for Mr. Berry's part in a panel discussion at the joint NFA-APFC meeting this month.

Here we present a list of the questions submitted to the control officials along with a tabulation of their replies to each question. Following the answer chart is a summary by states of modifications, additional information and explanations relating to those answers marked by asterisks.

Notes refer to numbered questions in questionnaire.

Alabama: 1, 7 — Aldrin, Dieldrin, DDT, Chlordane. **10**—Regulations are now being considered, probably will be promulgated and put into effect in 1955. **16, 17**—These mixtures are permitted upon written order signed by purchaser, with complete formula, tonnage, name and address of purchaser—must be labeled. **20**—Have had no requests for mixtures containing pesticides and lime or pesticide and gypsum.

Arizona: 7—DDT for lawn use only. **11, 12**—Problem has not come up to date, but would not permit use of woven bags. **13**—Those sold for lawn use packaged in paper bags. **20**—If materials appeared to be compatible, they would have to be accepted. **21**—New laws HB-147 and MB-143 governing these materials passed by Legislature in 1955, effective January 1, 1956. Regulations covering fertilizer-pesticide mixtures will be in order after effective date of new law.

Arkansas: 1—Some is being used on an experimental basis by individuals. As yet, we have not received an application for sale of these mixtures. Comments: **We are filling out this questionnaire giving answers as to how we think these mixtures would be regarded by us. 6**—Only tonnage tax. **7**—Aldrin—for control of Rice Field Mosquito and Rice Water Weevil. **8** — No recommendations have been made as yet. **9**—Would possibly limit to recommendations. **11**—Probably would under certain conditions. **12**—Probably would. **13**—Probably would not. **20**—Would if approved by Federal Insecticide, Fungicide and Rodenticide Act.

California: 7—Aldrin and Dieldrin. **Comments:** We apply all the requirements of the pesticide law and the fertilizer law to these mixtures just the same as if they were separate items. Have had no difficulty so far.

Colorado: 7 — Aldrin, Dieldrin and Chlordane. **11, 12, 13**—Question has not come up. **17**—Would be if permitted. **18**—Fertilizer, yes. **Comments:** Fertilizer-Pesticide Mixtures are considered and treated separately by Colorado Department of Agriculture.

Connecticut: 3, 4, 5—Registration is not required under Pesticide Law. **7**—DDT only. **14**—Ingredient statement only. **20** — Question has not come up.

Delaware: 7—No Regulations. **18**—Fertilizer only.

Florida: 7—Aldrin, Chlordane, DDT predominate. **12, 13**—We have not specified the kind of bag. **15**—Yellow Tag required. **16**—All such mixtures are made on special order. **20**—No restrictions on such mixtures if in accordance with Tech. Reg. #5. **Comments:** Tech. Regulation #5 specifies pesticides which may be mixed with fertilizers and regulates conditions of sale, percentage, use, storage and distribution. "Fertilizers containing pesticides may be made only on special order for prompt use and may not be stocked (except for use on lawns, turf and ornamentals)."

Georgia: 7—Aldrin, Chlordane, DDT. **10**—Regulations 3-2-55, Sec. 2—Field Crop Fertilizers with pesticides, (Food, Forage, Fiber and Tobacco formulations) may contain those organic pesticides that are known not to effect flavor or are incapable of translocation so as to transmit residues, and may be sold without restriction as to area or package size, except that there be no bulk sales or deliveries of these mixtures. All packages must be fully labeled showing both the fertilizer and the pesticide guarantees, and must be in conformation with both laws. All labels must be acceptable under the Georgia Economic Poisons Act and the Federal Insecticide, Fungicide and Rodenticide Act. Dual registration under the Georgia Fertilizer Law and the Georgia Economic Poisons Act is required.

Idaho: 7—DDT, Aldrin, Chlordane.

Illinois: 7—Aldrin, Boron.

Indiana: 7—Aldrin, Dieldrin, Lindane. **18**—Analyze as fertilizer only at present but are preparing to analyze for pesticides. **20**—No control. Indiana does not have a Pesticide Law, however, such mixtures are regulated under Indiana Fertilizer Law. Items must be labeled to show ingredient percent, and bear caution and direction statement similar to requirements of the Model Pesticide Law. Labeling directions issued January 1955.

Iowa: No report.

Kansas: 7—Aldrin. **13**—Recommended, not required.

Kentucky: 2—**Note:** Fertilizer-Pesticide Mixtures must be labeled as directed by Kentucky Experiment Station, showing percent of pesticide, directions for use and a caution or warning statement before permit is issued. **7**—Aldrin, Chlordane. **18**—Analyze fertilizer only. **20**—Question never raised.

Louisiana: 7—Aldrin. **11, 12**—Question has not come up. We will probably require paper bags. **16**—Pesticide Law requirements would apply. **20**—Pesticide Law requirements would apply.

QUESTIONS

Does your State have a Fertilizer Law?
Does your State have a Pesticide Law?

1. Are Fertilizer-Pesticide Mixtures sold in your State?
2. Are **these mixtures** registered under your Fertilizer Law?
3. Do you have a law regulating Pesticides?
4. Are **these mixtures** registered under your Pesticide Law?
5. Do you collect the regular fee under your Pesticide Law?
6. Do you collect the regular fee and tonnage tax under your Fertilizer Law?
7. Name the pesticides which are generally used in these mixtures in your State.
8. Does your State Experiment Station recommend fertilizer-pesticide mixtures?
9. Do you limit registration and distribution of fertilizer-pesticide mixtures to those mixtures recommended by the State Experiment station.
10. Have you issued regulations covering the sale and distribution of these mixtures?
11. Do you permit sale in bulk?
12. Do you permit sale in woven bags?
13. Do you require that mixtures be distributed in heavy paper containers?
14. Do you require a label showing:
    (a) Ingredient statement for both fertilizer and pesticide?
    (b) Directions for use?
    (c) Warning statement.
    (d) Other requirements under both laws.
15. In addition to the above label, do you require a Red Tag bearing a warning or other statement?
16. Do you permit "Buyers Mixtures" or "Farmers Mixtures whereby a farmer may have any pesticide added to his fertilizer by the manufacturer?
17. Are sales under 16 above subject to regulation under Fertilizer and Pesticide Laws?
18. Do you analyze fertilizer-pesticide mixtures?
19. Have you established tolerances for deficiency or excess of pesticide?
20. Do you permit the sale of lime or gypsum mixed with pesticides?
21. Are changes in your laws now being considered?

ANSWERS

STATE	Fert. Law?	Pest. Law?	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14a.	14b.	14c.	14d.	15.	16.	17.	18.	19.	20.	21.
Alabama	Yes	Yes	Yes*	Yes	Yes	Yes	Yes	Yes	No*	Yes	Yes	No*	No	—	—	Yes	Yes	Yes	—	No	Yes*	— *	No	No	No*	—
Arizona	Yes	Yes	Yes*	Yes	Yes	Yes	Yes	Yes	Yes*	No	No	No	No*	No*	No*	Yes	Yes	Yes	—	No	No	Yes	Yes	Yes	Yes*	Yes*
Arkansas	Yes	Yes	No*	Yes	Yes	Yes	Yes	Yes*	No*	No*	Yes*	No	Yes*	Yes*	No*	Yes	Yes	Yes	—	No	Yes	Yes	No	No	Yes*	No
California	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	No	No	No	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No
Colorado	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	No	No	No	No*	Yes*	Yes*	Yes	Yes	Yes	Yes	Yes	No	Yes*	Yes*	No	No	No
Connecticut	Yes	Yes	Yes	Yes	Yes*	No*	No*	Yes	Yes*	No	No	No	Yes	Yes	No	Yes	No	No	—*	No	Yes	No	Yes	No	No*	Yes
Delaware	Yes	No	Yes	Yes	No	—	—	Yes	Yes*	No	No	No	Yes	Yes	No	No	—	—	—	No	Yes	No	Yes*	No	Yes	Yes
Florida	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes*	No	No	Yes	No	No*	No*	Yes	No	Yes	—	Yes*	Yes*	Yes	Yes	No	No*	No
Georgia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	No	No	Yes*	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No
Idaho	Yes	No	Yes	No	No	No	No	Yes	Yes*	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	Yes	No	Yes	No	Yes	No
Illinois	Yes	No	Yes	Yes	No	No	No	Yes	Yes*	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No
Indiana	Yes	No	Yes	Yes	No	No	No	Yes	Yes*	Yes	Yes	Yes	Yes	—	No	Yes	Yes	Yes	—	Yes	Yes	Yes	Yes*	No	No*	No
Iowa	Yes	Yes																								
Kansas	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	Yes	Yes	No	No	No	No*	Yes	Yes	Yes	—	No	No	Yes	Yes	No	No	No
Kentucky	Yes	No*	Yes	Yes	No	No	No	Yes	Yes*	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	—	No	Yes	Yes	Yes*	No	No*	No
Louisiana	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	No	No	No	No*	No*	Yes	Yes	Yes	Yes	Yes	No	No*	Yes	Yes	No	No*	No
Maine	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes*	No
Maryland	Yes	Yes	Yes	Yes	Yes*	Yes*	Yes	Yes	Yes*	No	No*	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes*	Yes
Massachusetts	Yes	No	Yes	Yes	No	—	—	Yes	Yes*	No*	No*	No	No*	No*	No*	No	No	No	No	No	Yes	No	Yes	No	—	Yes*
Michigan	Yes	Yes	Yes	Yes	Yes*	Yes*	Yes	Yes	Yes*	Yes	Yes	Yes*	No	No	Yes	Yes	Yes	Yes	Yes	No	No	—	Yes	No	No	No
Minnesota	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	Yes	No	Yes	Yes	Yes*	No*	Yes	Yes	Yes	—	No	Yes*	Yes	Yes	No	Yes*	No
Mississippi	Yes	Yes	No*		Yes																					
Missouri	Yes	No	Yes	Yes*	No	No	No	Yes	Yes*	No	No	No	Yes	Yes	No	*	*	*	—	No	Yes	Yes	Yes	No	Yes	Yes*
Montana	Yes	Yes	No	Yes	Yes	No	No	Yes	No*	No	No	No	—	—	—	Yes	Yes	Yes	*	No	Yes	No	No	No	—	No
Nebraska	Yes	No	Yes	Yes	No	No	No	Yes	Yes*	—	—	No	Yes	Yes	No	Yes*	No	No	— *	No	Yes	No	No	No	Yes	No
Nevada	No	No																								
New Hampshire	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	Yes	No	No	Yes	Yes	No	Yes	Yes	No	—	No*	Yes	Yes	Yes*	No	Yes	Yes
New Jersey	Yes	Yes	No*	Yes	Yes	Yes	Yes	Yes	—	No*	No*	No	No*	No*	No*	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes*	No*	No	No
New Mexico	Yes	Yes	No*	Yes	Yes	Yes	Yes	Yes	Yes*	No	Yes	No	No	—	—	Yes	Yes	Yes	—	No	No	—	Yes	No	No	No
New York	Yes	Yes	No	Yes*	Yes	No*	No	Yes	Yes*	No*	No	No	Yes*	Yes*	Yes*	Yes	Yes	Yes	—	No	—	Yes	Yes	No	—	—
North Carolina	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes*	No*	No*	Yes*	Yes*	No*	No*	Yes	—	Yes	*	Yes	Yes*	Yes*	Yes	No*	Yes*	No*
North Dakota	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	No*	Yes	No	—	—	Yes	Yes	Yes	Yes	Yes	No	Yes	No	—	No	—	No
Ohio	Yes	No	Yes	Yes	No	No*	No	Yes	Yes*	No*	No	No	Yes	Yes	No	No	No	No	—	No	Yes	No	No	No	Yes	No
Oklahoma	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	No*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Oregon	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	Yes	No	No	Yes	Yes	No	Yes	*	Yes	—	No	Yes	Yes*	Yes	No	Yes	Yes
Pennsylvania	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	Yes	No	No	Yes	Yes	No	Yes	—	Yes	—	Yes	Yes	No	Yes*	No	Yes	No
Rhode Island	Yes	Yes	No*	Yes	Yes	Yes	Yes	Yes	—	Yes*	—	—	Yes*	Yes	No	Yes	Yes	Yes	—	No	Yes*	No*	Yes*	No	Yes*	No
South Carolina	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes*	Yes	No*	Yes	Yes	Yes	No	Yes	Yes	Yes	—	Yes*	Yes	Yes	Yes	No	No*	No
South Dakota	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	—	No	No	No	No*	No	No	Yes
Tennessee	Yes	Yes	Yes*	Yes	Yes	Yes	Yes	Yes	Yes*	Yes	Yes	No	No	No	No	Yes	Yes	Yes	—	No	Yes	Yes	No	No	Yes	—
Texas	Yes	Yes	No*	—	Yes					No																No
Utah	Yes	Yes	No*	Yes*	Yes	Yes*	Yes*	Yes*	—	No	No*	Yes*	Yes*	Yes*	No*	Yes	—	Yes	—	No	No	—	Yes	No	No	No
Vermont	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	—	No	Yes	Yes	Yes	No	—	No
Virginia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	No	—	Yes	Yes	No	No
Washington	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	Yes	No	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No*	Yes	Yes	No	Yes	Yes*
West Virginia	Yes	No	Yes	Yes	No	—	—	Yes	Yes*	No	No	No	Yes	Yes	No	No	No	No	No	No	Yes	Yes	Yes*	No	Yes	No
Wisconsin	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	Yes	No	No	Yes	—	—	Yes	Yes	Yes	— *	No	Yes	Yes*	Yes*	No	No*	No
Wyoming	Yes	Yes	No*	Yes*	Yes	Yes*	Yes*	Yes*	—	No	—	No	—	—	—	Yes	Yes	Yes	Yes	No	No	Yes	No	No	—	No
Hawaii	No	Yes	Yes	No	Yes	Yes	Yes	No	No*	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No	No
Puerto Rico	Yes	Yes	Yes	Yes	Yes	Yes*	No	Yes	Yes*	No*	No	No	Yes	Yes	No	Yes	Yes	Yes	*	Yes*	No*	No*	Yes	No	No*	No
Canada	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	Yes*	No*	No	No	No	Yes*	Yes*	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes*	—	No*

*Refer to state heading in text of article for detailed information, explanation or comment.

Maine: 7—Registration permitted on grades recommended by the Maine Experiment Station. 20—No requests.

Maryland: 3, 4 — **Note:** Fertilizer-Pesticides must meet **all requirements of both** the Fertilizer Law and the Pesticide Law. Must be registered under both laws. 7—Aldrin. 9—Experiment Station approves application before registration. 20—These have in the past been acceptable i.e. bordeaux mixtures, etc., however, the newer pesticides introduce problems not encountered heretofore. Therefore, each application is considered on its merits. We have not had the question up for discussion currently.

Massachusetts: 7—2,4-D, Chlordane. 8, 9—Very limited sale of fertilizer-pesticide mixtures. Experiment Station so far has recommended neither for nor against the use of such mixtures. 11, 12, 13 — These mixtures have been distributed in heavy paper sacks, but we have no requirements to this effect. 21—Yes, but not for immediate future.

Michigan: 3, 4—**Note:** Mixtures subject to all requirements of both Fertilizer and Pesticide Laws. Must be registered under both laws. 7—Aldrin and Chlordane (only). 10 — Regulations permitting the use of fertilizer-pesticide mixtures were adopted March 14, 1955, and the plan for these mixtures, under the regulations, is just beginning to materialize. Regulations are in close accord to Virginia Regulations.

Minnesota: 7—Aldrin, Dieldrin, Heptachlor and Chlordane. 12 — These mixtures have never been offered for sale in such containers. 13—No regulation requiring paper containers, however, such containers in common use. 16—Yes, if registered. 19—None registered.

Mississippi: Dr. M. P. Etheredge gave the following information: No Fertilizer-Pesticide mixtures used in Mississippi so far. One application for use of a Fertilizer-Pesticide Mixture was presented; the State Plant Board stated that the application was acceptable, however, the company has not completed registration. Dr. Etheredge did not state that this mixture was intended for use on food crops. If these combination materials are used, regulations under existing fertilizer and pesticide laws will be established.

Missouri: 2—The Missouri Fertilizer Law requires Company registration, but does not require brand or grade registration. 7—Aldrin, Chlordane. 14— (a) (b) (c)—Recommended but not required for pesticides. 21—A pesticide bill is now before our legislature.

Montana: 7—None sold in this state. 14 (d)—We accept Federal Label.

Nebraska: 7—Aldrin only and volume sold is very small. 14—The label shall state "name of Fertilizer with Aldrin"—% of aldrin and purpose for its use.

Nevada: No report.

New Hampshire: 7—2,4-D. 15—We feel that a red tag should be required. 18—Plant food only.

New Jersey: 1—None for Food Crop Use. 8, 9—None recommended. The Experiment Station feels this is not the proper way to control pests. The few mixtures registered have been handled as Special Mixtures, and are for use on lawns, parks and golf courses. 11, 12, 13—No regulations. 18—Have made attempts to analyze pesticides in mixtures. 19—No requests. **Comment:** Very little interest in these mixtures in New Jersey.

New Mexico: 1, 7—No Fertilizer-Pesticide Mixtures for use on food crops sold in New Mexico. We register these mixtures for use on lawns and ornamentals.

New York: 2—Pesticides are not required to be registered under N. Y. Pesticide Law if they are registered under Federal Act. We do require that they be registered as a fertilizer and properly labeled. 7—Chlordane. 8—No comment. 11, 12, 13—Question has not arisen, generally sold in paper bags.

North Carolina: 7—Chlordane, Aldrin, Dieldrin, Heptachlor, Toxaphene and DDT. 8—The Experiment Station neither recommends nor opposes fertilizer-Pesticide mixtures. Among the reasons for this are that the most effective application of pesticides to soil generally is by broadcasting while fertilizers are more often applied in the rows. Under varying conditions, satisfactory rates of application of the two when mixed becomes a rather acute problem. 9—The Experiment Station does not recommend any fertilizer-pesticide mixture, however, acceptance for registration under the North Carolina Law would not be extended beyond the six items listed under question 7 above, which represents those that have been qualified as permissible in fertilizer - pesticide mixtures. 10—North Carolina Regulations 8-36.1 and 8-36.2. 11—Question of the sale in bulk of fertilizer-pesticide mixtures has not arisen, however, there is no prohibition against it. 12—Sale of fertilizer-pesticide mixtures in woven or fabric bags has not been specifically prohibited, however, recommendations would be against it. Failure to heed such recommendations would dictate possible withdrawal of registration or promulgation of regulation. 13—Heavy paper containers are not required in the distribution of fertilizer-pesticide mixtures, however, no package which permitted leakage or dusting out of these mixtures would be considered acceptable. 14 (d)—All the requirements of the fertilizer law, also requirements for fertilizer-pesticide mixtures as given in regulations apply. 16—"Buyers" or "Farmers" mixtures present the same old problems, whether only fertilizers or fertilizer-pesticide mixtures. These would not be recommended nor encouraged; however, there is no prohibition or law against them. 17—Circumstances would have a large bearing on the application of the fertilizer law to special mixes. No practical method of setting up exact lines of demarcation has yet been forthcoming. 19—Tentatively and subject to revision, tolerances as for pesticides are followed. 20—Question regarding the sale of pesticides mixed with lime or gypsum has not arisen here. Upon arising, such mixtures apparently would not be subject to the same considerations given to fertilizer-pesticide mixtures in the regulations. 21—Need for changes being studied.

North Dakota: 7—Chlordane, 2,4-D. 8—Sales of fertilizer-pesticide mixtures in North Dakota is extremely small. Mostly products for use on lawns to add fertilizer and control weeds at the same time. One company has a product registered to use when transplanting plants. A fertilizer mixture with chlordane for cut worm control. Quantity of such materials sold is very small. We have no actual figures. We try to follow a policy in keeping with the following statement of the State Experiment Station. "The use of insecticide-fertilizer combinations involves two problems: (1) the selection of the insecticide and the rate of application necessary to do a specific job and (2) the selection of the specific fertilizer formula and rate of application necessary to fulfill the nutritional requirements of the crop to be grown on a particular field. Since not all insecticides are compatible with every fertilizer fomulation, and since choice and rates of application of insecticides and fertilizers vary with the specific insect, soil and crop in question, production and sale of general purpose insecticide-fertilizer combinations is not recommended. Custom mixed insecticides and fertilizers, designed to meet specific problems, are the only products currently approved. Insecticides

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with Federal registration for use in insecticide-fertilizer mixtures are acceptable, within the limits of such registration, by the Department of Agricultural Entomology of the North Dakota Agricultural Experiment Station."

Ohio: 4—Comments: We have no law regulating the use and sale of pesticides. Mixtures with fertilizer are licensed as fertilizers with no provisions as to labeling other than as fertilizers. At the present, most mixtures are made up on a custom mix basis and very few offered for sale for commercial crops. **7**—DDT, Do not know others as most pesticide mixtures are made up on custom mix basis. **8**—Not for general use as yet.

Oklahoma: 7, 8—No fertilizer- pesticide mixtures for use on commercial crops offered for sale in Oklahoma. If such mixtures are recommended by the Oklahoma Experiment Station in the future, they will be registered upon payment of regular fees, provided they are properly labeled and in compliance with Oklahoma laws and regulations. This material is of little importance in Oklahoma and has not presented a problem.

Oregon: 7—Principally Aldrin, some Heptachlor and Toxaphene. **14 (b)** Do not require. **17**—Pesticide "warning" label required on "Farmer's Mix."

Pennsylvania: 7—Chlordane, Lindane, and DDT. **18**—Have analyzed a few.

Rhode Island: 1—Apparently such mixtures have not yet been sold in this state or have not been detected. Therefore, many of the answers refer to **what we would require. 8**—Tentatively undecided. **11**—If properly labeled. **16**—Yes, if ingredients are registered. **17**—Only if ingredients are registered. **18**—Reserve right. **20**—Action will depend on Experiment Station Recommendations.

South Carolina: 7—Chlordane, Aldrin, Heptachlor and Toxaphene. **9**—In the past, a few pesticide-fertilizer mixtures have been registered before they were actually recommended, but at the present all of the material registered have either full or partial recommendation. **15**—Our recent regulations do not specify that the tag be red, but we do require a colored tag. We felt that it would aid industry if we permitted different colored tags. **20**—We have no requests for this type of mixture.

South Dakota: 7—Aldrin, Dieldrin. **18**—Will do so soon.

Tennessee: 1—Can be sold; none accepted for use on food crops. **7**—Chlordane, Aldrin, Dieldrin, Heptachlor, Toxaphene are allowed in Fertilizer-Pesticide Mixtures for uses **other than food crops.**

Texas: 1—We still refuse to register Fertilizer-Pesticide mixtures in Texas.

Utah: 1—No fertilizer-pesticide mixtures being sold for use on food crops. **Answers indicate probable action if they were accepted.** Note: Four mixtures have been registered for use on lawns only.

Vermont: 7—Chlordane and DDT.

Virginia: 7—Virginia has a restricted List of Approved Grades of Fertilizers. Grades0-14-14, 0-10-20 and 2-12-12, containing 8 lbs. of Aldrin or 8 lbs. of Heptachlor per ton, are recommended by the Virginia Experiment Station for use on peanuts for the control of Southern Corn Root Worm. **8**—No other Fertilizer-Pesticide mixtures for use on food crops are recommended by the Virginia Experiment Station or permitted to be sold or distributed.

Washington: 7—Aldrin, 2,4-D. I.P.C. **16**—Probably has been done without our knowledge. **21**—By regulations.

West Virginia: 7—Chlordane. **18**—Are analyzed for fertilizer component only.

Wisconsin: 7 — Aldrin, Dieldrin, Chlordane. **14 (d)**—Have not drawn up labels. **17, 18**—Yes, on fertilizer, no under pesticide if custom mix. **20**—None sold.

Wyoming: 1—Little interest in these mixtures, none registered. **2, 4, 5, 6**—Before sale, mixtures must be registered and, meet all requirements (fee, labeling, etc.) of both laws.

Hawaii: 7—Weed killers, 2,4-D and 2,4,5-T.

Puerto Rico: 4—Under the Puerto Rico Economic Poison Act these products should be registered. We are now in the process of requiring registration of them. **7**—To the present time, only aldrin is being used. **8**—Fertilizer-Aldrin mixtures used in Puerto Rico is intended primarily to control the white grub attacking sugar cane roots. The Agricultural Experiment Station does not encourage this practice simply because it has proven of very little value in the control of this pest. **14**—It will be required that the label show both ingredient statement for fertilizer and pesticide, directions for use and warning statement. Since we have just started to require registration, no label is available at present. **15**—We have not reached a decision as to this matter. **1, 17, 20**—These cases have not arisen yet.

Canada: 6—Collect fees—no tonnage tax. **7**—Thiram, 2, 4-D, Lindane, Aldrin, Dieldrin, Heptachlor. **8**—Some for lawns, none for food crops. **12, 13**—Paper bags are generally used, but woven bags are permitted. **14**—Must be registered and labeled under both laws. **19**—Tolerance is that associated with accuracy of method. Excesses have not been demonstrated. **21**—Not in specific relation to these mixtures.

CROP CHEMICALS

Crop Chemicals Lead In Chemical Progress Vote

Compounds that enrich the soil, control insects, and contribute to increased meat and dairy production rank among the most useful chemical developments of the last 35 years.

That's the word of a panel of nine experts, distinguished in the fields of science, education, and publishing, who were asked to make the selection to mark Chemical Progress Week.

The results of their survey appear in the May-June issue of "Better Living," the Du Pont Company employee magazine.

In all, 27 developments were singled out by the panel. Synthetic fertilizers, synthetic insecticides, and feed compounds were placed among the 10 most useful developments.

On the panel of experts were Fleur Cowles, associate editor of "Look" magazine; Watson Davis, director of Science Service; Dr. Barnett F. Dodge, president of the American Institute of Chemical Engineers; William C. Foster, president of the Manufacturing Chemists' Association; Dr. Joel H. Hildebrand, president of the American Chemical Society; Herbert R. Mayes, editor of "Good Housekeeping;" Walter J. Murphy, editor of "Chemical and Engineering News;" Dr. Clifford F. Rassweiler, honorary secretary of

Applied 1½ pounds to the acre, Amizol accomplished virtually complete defoliation of this cotton in an experiment by Dr. Wayne Hall, at the Texas Agricultural Experiment Station in the Brazos River Valley. Ninety per cent of the leaves were picked clean from this cotton crop by the defoliant newly discovered by American Chemical Paint Co., Ambler, Pa., to be marketed as "Meeno."

the American Section of the Society of Chemical Industry; and Dr. Hugh Taylor, dean of the Graduate School of Princeton University.

Among the "giant steps" of the last 35 years to which the chemical industry has contributed are improvements in food, to which the industry has contributed with new fertilizers, insecticides, weed killers, fungicides, refrigerants, and packaging materials.

Cotton Pest Research Needed, Says Ewing

A large expansion in fundamental cotton insect research is urgently needed.

Fundamental research—as opposed to short-term, applied research—possibly could show us how to control pests without depending on highly poisonous compounds which require frequent and expensive applications.

This statement was made during the eighth annual Beltwide Cotton Insect Control Conference, held in Dallas and sponsored by the National Cotton Council.

K. P. Ewing, head, cotton insects section, USDA, stated:

"One approach is to determine the nutritional requirements of the insects. Right now we do not know the requirements of a single cotton insect. We do know that three of our worst pests—the boll weevil, the pink bollworm, and the cotton leafworm—can live on nothing but cotton or closely related plants. If we knew their nutritional needs, we might be able to breed out of cotton some special substance that completes their development."

If research expansion can be brought about, one of the highest priorities should go to study of systemic insecticides, Mr. Ewing said. Systemics, he added, moving in the sap stream of plants, would pose very little danger to beneficial insects which live primarily on other insects.

In the first section of the booklet, E. F. Knipling of the Department of Agriculture pointed out that during the last hundred years, the achievements of entomology have been translated into billions of dollars in our national income and into more healthful living for millions of people.

Dr. Knipling agreed with Mr. Ewing, however, in believing there is still a great need for more fundamental research.

"Whether we are to make rapid progress in these and other fields of research will naturally be influenced by the degree and type of support obtained from state and federal governments, from industrial research institutions and from other sources."

Test Packages Of New Herbicide Offered

American Cyanamid has announced the availability, in limited quantities, of the promising new herbicide Amino Triazole as follows:

"Although Amino Triazole seems to offer a great deal of promise for the future, we do not, at this time, have enough information to write a label and secure its acceptance for commercial sale. We have, though, been granted acceptance of an "experimental label," which permits us to sell small quantities direct to users of herbicides to enable them to test Amino Triazole against their particular weed problem.

"If you are interested in testing Amino Triazole or know of a good farmer that has a weed problem against which this material looks promising, we can furnish you or him with a four-pound package of Amino Triazole Herbicide at a price of $2.50 per pound, $10.00 per package, shipment to be made direct to user postage prepaid. Full instructions concerning its suggested uses and amounts to apply will be on the label. Orders for the $10.00 package, along with check or money order to cover, should be sent direct to the American Cyanamid Company, Nitrogen Department, 30 Rockefeller Plaza, New York 20, New York.

"We are hopeful that in 1956 we will have an approved commercial label and adequate supplies so that Amino Triazole Herbicide will be available through regular supply channels."

OBITUARIES

Clyde L. Benton, 52, retired district manager for Southern Fertilizer and Chemical Co., died May 23 at Walterboro, S. C.

Julius B. Cronheim, 70, vice president of Fulton Bag and Cotton Mills, died May 15 at St. Louis, Mo.

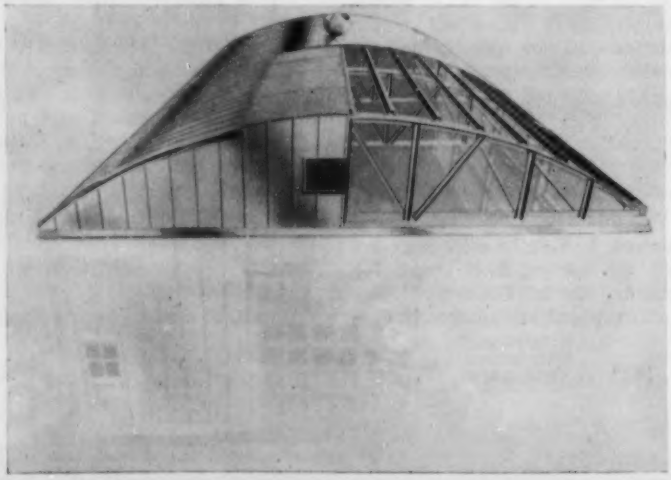
Charles Luther Ives, onetime NFA director and former president of New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C., died April 6.

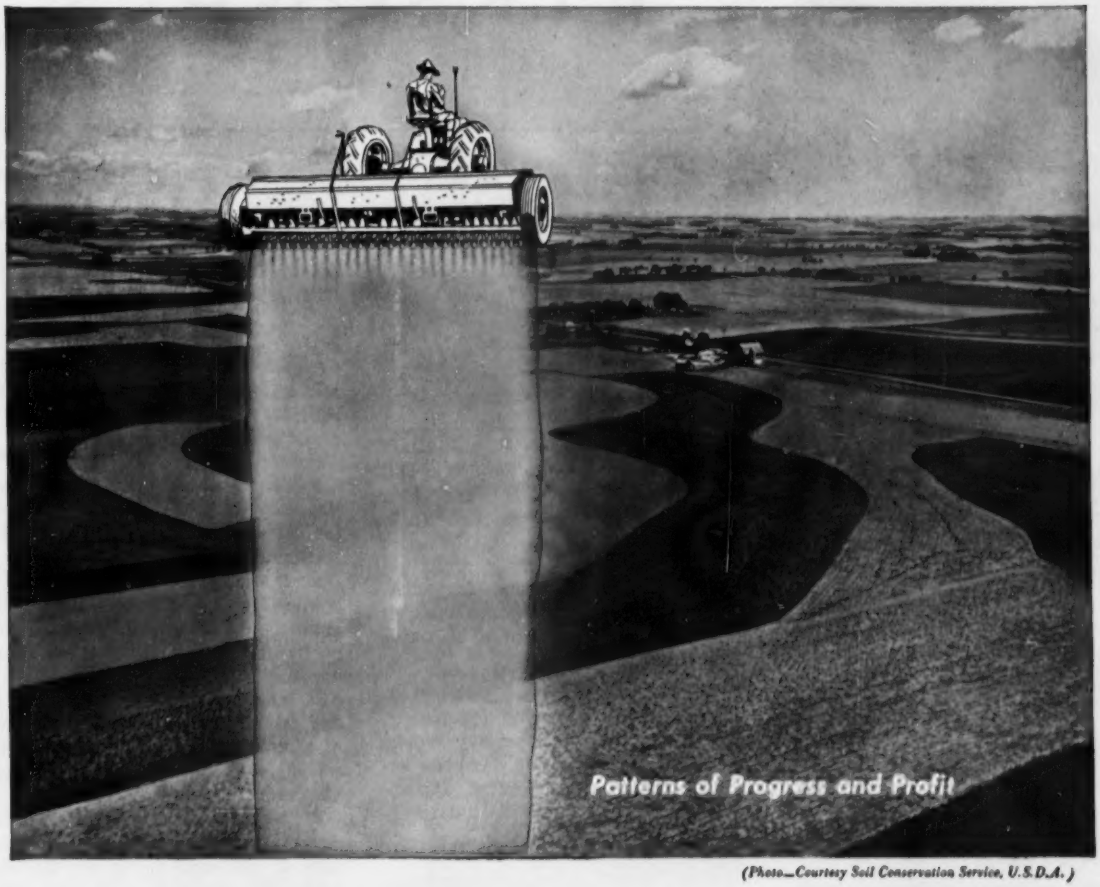
The Brookville Manufacturing Company has available a complete line of pre-engineered, all-steel, fully insulated roofs for buildings. These are fully suitable for use with buildings made with masonry or steel side walls. Insulation provided may be either fiberglas or homosote.

These roofs are for clear span structures, and are furnished in standard spans of 40, 48, 60 and 80 feet. They meet AISCO code requirements, being designed for 30 lb. per sq. ft. live loading and 20 lb. per sq. ft. wind loading.

As desired, they can be furnished with ventilators, louvers, and plastic sky lights.

For additional information on these units, write Sales Control, Brookville Manufacturing Company, Brookville, Pa.





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PERSONALS

Sanford Retires

John E. Sanford

John E. Sanford, of Atlanta, president for the past 23 years of **Armour Fertilizer Works, Inc.**, retired June 3.

Mr. Sanford, also a vice president of the parent Armour & Company, Chicago, from 1932 until his retirement, devoted all 51 years of his business career to the fertilizer industry. He started with Tennessee Chemical Company, which was bought by Armour in 1909. He was elected president of Armour Fertilizer Works in 1932, the same year that the general offices were moved to Atlanta, and also was named vice president of Armour & Company.

Mr. and Mrs. Sanford are planning to leave on a European tour early in July with one of their granddaughters, Nancy Lee Boynton.

Glenn O. Middleton has been appointed manager of the Dubuque sales office of Virginia-Carolina Chemical Corporation, effective June 1, it was announced by C. Cecil Arledge, vice president of the firm. Middleton joined V-C in 1937 and succeeds Harold S. Vorhes, who recently resinged to form his own company.

At the same time Arledge announced the appointment of C. Aubrey Clayton to the position of assistant manager of the Dubuque office. Clayton has been associated with V-C for four years as a salesman at Memphis, Tenn.

Mark B. Stringfellow, who has been named manager of market development at Spencer Chemical Company, a newly-created marketing position.

Robert O. Parks, May 20, was named general sales manager of **Grace Chemical Company.** Since joining Grace Chemical in early 1953, Dr. Parks has been serving as manager of agricultural services.

Prior to his association with Grace Chemical, he was head of soil management and irrigation agriculture for USDA in Beltsville.

* * *

Langbourne M. Williams, president, **Freeport Sulphur** was elected chairman of the National Industrial Conference Board at the board's 39th annual meeting held in New York, May 19.

* * *

Pierre F. Gunder and **James A. Long, Jr.** have joined the research and development division of **Davison Chemical.**

Mr. Gunder has been assigned to the research engineering department at the company's Curtis Bay Works in Baltimore. Mr. Long has been assigned to the development department at the company's Baltimore office.

* * *

Bruce B. Miner, editor and advertising manager of the Merrimack Farmers' Exchange, Concord, N. H., has been named editor at **The Connecticut Agricultural Experiment Station,** according to **Dr. James G. Horsfall,** director. Mr. Miner replaces **Miss Amanda Quackenbush** who was editor since 1944 and who recently resigned to become Mrs. Gerald E. Zich of Trenton, N. J.

* * *

Robert H. Engle, who has been with NFA since 1938, as agronomist and as director of their many excellent color films, has gone with the fertilizer division of the **US Technical Cooperative Mission** to India where he will work with **Dr. Frank Parker,** well known to our readers for his work at Beltsville with **USDA.**

* * *

Dr. M. K. Miller, former chief agronomist of **Tennessee Corporation** has become president of **Green Belt Chemical** who are building a plant in Ohio.

* * *

F. G. Bemis, president of **Bemis Bro. Bag Company,** Boston, has been reelected a board member of the National Industrial Conference Board for a term of one year.

The Conference Board, founded in 1916, is an independent and nonprofit institution for business and industrial fact finding through scientific research. In terms of everyday usefulness, the Board is a source of facts and figures bearing on all aspects of economic life and business operation.

F. W. Ayers has been made sales manager of their Vancouver, Washington, multiwall bag plant. He was formerly sales manager for the multiwall department of the company's San Francisco plant.

R. J. McDonald, has been named sales manager for the company's packaging service department in Minneapolis. Packaging Service designs and builds bag filling, closing and conveying equipment. Mr. McDonald will take up his new responsibilities there on July 15.

* * *

Robert W. Crabtree has been appointed to the newly-created position of manager, nitrogen products

Fulton Bag changes: Left, John Fulton Ryan, now manager of their St. Louis Multiwall paper bag division. Center, August W. Moenkhaus, manager of textile and Multiwall sales in St. Louis territory. Right, Charles Richard Bronaugh, new sales representative in Kansas City office. Not shown, Harry Kanatzar Jr., new sales representative in Denver office.

sales, it was announced by **J. M. Martin,** general manager of **Hercules Powder's** explosives department.

Mr. Crabtree will supervise the sales of nitrogen products including ammoniating solutions, anhydrous solutions, ammonium sulfate, and ammonium nitrate, with headquarters in Wilmington.

Mr. Crabtree, who has been with Hercules since 1934, has been sales manager for nitrogen products in San Francisco. He will be suceeded in that position by **R. E. Segerdell.**

• • •

Appointment of **Wayne D. Wegrich** as manager of the Waco, Tex., plant of **Diamond Black Leaf Company** was announced by **George V. Dupont,** manager of manufacturing.

Mr. Wegrich comes to the Diamond Black Leaf organization from **Minnesota Mining & Manufacturing.** From 1952 to 1954, he was connected with **Virginia-Carolina Chemical** in various supervisory capacities.

• • •

Arkell & Smiths, have appointed **R. S. Seymour** as their new Philadelphia district representative. Mr. Seymour will now make his office at 1421 Land Title Building, Philadelphia 10, Pennsylvania, and will work under the direction of **Tom L. Jones,** central sales manager.

• • •

Phelps Dodge Refining, New York, have announced the election of **Howard Barkell** to the board of directors, and of **Charles H. Winship, Jr.,** to vice-president. Mr. Barkell is a vice-president of the Refining Corporation and Mr. Winship is sales manager of both Phelps Dodge Corporation and Phelps Dodge Refining Corporation.

• • •

American Agricultural Chemical announces the appointment of **D. S. Parham** as general superintendent, in charge of fertilizer production. Mr. Parham, who has been associated with them since 1947, was formerly general superintendent of maintenance, and has been active in the

C. W. Ingham, who has been made Ohio territory sales representative for Albermarle Paper, it was announced by salesmanager J. R. Clements.

Marlin G. Geiger, left, president of the Davison Chemical Company Division of W. R. Grace & Co., and Charles E. Wilson, center, former director of defense mobilization and now Chairman of the Board of Directors of W. R. Grace & Co., discuss with Dr. Lowell J. Reed, president of The Johns Hopkins University, the establishment of the "Grace Chair of Chemistry" which the company will support at the university.
Insert: Dr. Paul H. Emmett, who has accepted an invitation to fill the new professorship, is a noted authority on catalysis and a division chief of the Manhattan Project in World War II. He comes to Hopkins from the Mellon Institute in Pittsburgh.

A. C. Greer, sales manager for the Indianapolis sales division, Bemis Bro. Bag Company, has announced organizational changes designed to concentrate sales activities and increase sales coverage in Indiana, Ohio, Kentucky and Michigan.
Three senior salesmen have been designated sales supervisors. They will report to Mr. Greer, who as sales manager will continue to have sales responsibility for the entire Indianapolis sales division territory. The three sales supervisors are:
U. E. Philpott, (1) formerly plant merchandiser at the Indianapolis plant, who will supervise sales in Indiana and Ohio.
R. C. Thomas, (2) formerly sales representative with headquarters in Grand Rapids, who will be in charge of the Detroit sales office and supervise sales in Michigan.
F. H. Schardt, (3) manager of the Louisville sales office, who will have supervisory responsibility for sales in Kentucky.
Also involved in the reorganization are H. F. Wilson, insert, who will move from Detroit to Indianapolis to assist the Sales Manager on sales promotion activities, and E. G. Harvey, (4) who was assistant sales manager and will become plant merchandiser for the Indianapolis plant.
J. A. Davis, not shown, has transferred from the Louisville office to Grand Rapids for sales work in that area, and F. L. Ashinger, not shown, has been moved to Detroit to work out of that office.

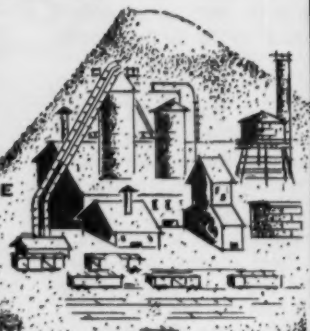
FROM THE WORLD'S STOCKPILES—TO YOUR PLANT...

Woodward & Dickerson, Inc. serves you
with an 80 year reputation for reliability in quality, price and delivery.

POTASH
MURIATE
SULPHATE
NITRATE

NITROGEN
SULPHATE OF AMMONIA
AMMONIUM NITRATE
CALCIUM AMMONIUM NITRATE
UREA

AND ALL OTHER **FERTILIZER** AND **FEED MATERIALS**



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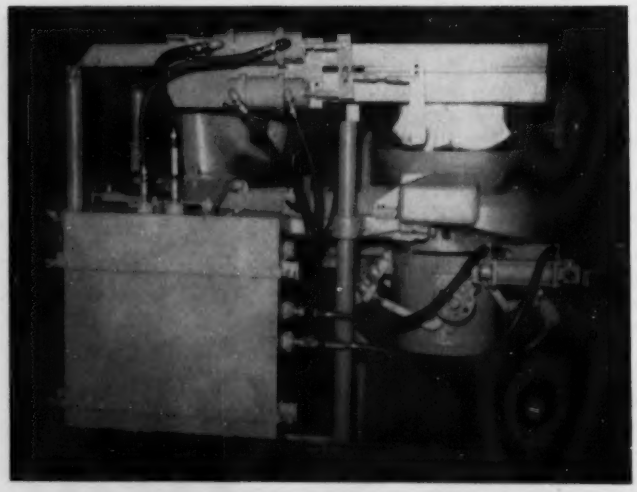
Branches in MADRID, MANILA, TOKYO, SEOUL, WASHINGTON, D.C., U.S.A.

SCHACHTE AUTOMATIC WEIGHING DEVICE

Model AJ 155

for attachment to
Exact Weight Bagging Scales

- Converts your manual bagging operation into a fast, accurate unit that clamps, weighs and releases bags automatically.
- No structural changes necessary for installation. The unit is attached to your present scale without any disruption of your operation.
- One unit will give more production and more accurate weights than is possible with two hand operated scales.



MOLONY FERTILIZER COMPANY
P. O. BOX 314 CHARLESTON, S. C. PHONE 4-5356

Put your Shipping Sack on your Sales Team

....with attractively designed brands and brilliant multi color printing by HAMMOND

HAMMOND Betterbags WELLSBURG, W.VA.

Hammond Multi-Walls

"TREES ARE A CROP"

Outstanding in appearance and durability . . . Hammond Multi-Wall bags create enthusiasm and pride among your sales representatives . . . help to increase sales through distributors and dealers . . . build prestige for your company and products, and provide complete protection of contents from packing machines to the ultimate consumer. Yes, you can put your shipping sack on your sales team by specifying Hammond Multi-Walls.

For Multi-Wall Bags,
"Make it a Habit to Depend on Hammond"

HAMMOND BAG & PAPER COMPANY

General Offices: Wellsburg, W.Va.
Plants in Wellsburg, W.Va., Pine Bluff, Ark. and Charlotte, N.C.

Representatives in the following cities: NEW YORK, N. Y., CHICAGO, ILL., MINNEAPOLIS, MINN., KANSAS CITY, MO., CLEVELAND, OHIO, ATLANTA, GA., WASHINGTON, D.C., DALLAS, TEXAS, CHARLOTTE, N. C., LIGONIER, PA., BLUEFIELD, VA.

EHRSAM

a name you can rely on –

To give you the best results in manufacturing fertilizer

MIXERS — **DRIERS**

HOISTING EQUIPMENT — **POWER TRANSMISSIONS**

CONVEYING EQUIPMENT — **AMMONIATOR SYSTEMS**

COMPLETE ENGINEERING SERVICE

When you want to cut your tonnage costs and boost your output, send for Ehrsam. That's been standard practice in the fertilizer processing field for many years. Ehrsam engineering service is keyed to your needs as an operator—whether you're replacing one item, modernizing, or planning a whole new plant. And long-lived Ehrsam equipment gives you efficient, dependable service long after its cost has been written off your books.

The J. B. Ehrsam and Sons Manufacturing Company—Enterprise, Kansas

Introducing . . . the "CESS" Electro-Selecto

—Cunningham's NEW Electronic Selector Check Scale

- Inserted into conveyor line from bagging unit, this device separates underweight and overweight bags from main line of accurately-filled bags—does not permit an inaccurately-weighed bag to continue on conveyor line to shipment or storage.
- Electro-mechanically sorts—at 20 to 25 bags per minute—bags or parcels from 25 to 200 pounds, with error tolerance adjustable from 2 ounces to 2 pounds. Underweight bags are shunted off main conveyor to gravity conveyor at one side, overweight bags to another on the opposite side.
- Electronic selector check scale features **positive** protection from outside contamination through well-known friction-free liquid scale seal—obtainable **only** from Cunningham Scale Seal, a product of the same manufacture.

CUNNINGHAM
ELECTRONIC SELECTING
CHECK SCALES

2213 Tubman Home Rd. AUGUSTA, GA. Phone: 2-5504

company's accident prevention program. He is located at the company's New York office, 50 Church Street.

* * *

St. Regis Paper Company announces that **Howard C. Peterson, Jr.,** manager of the Eastern district of the multiwall packaging division has become assistant general sales manager of the Kraft division. Mr. Peterson, who is also a vice president of the St. Regis Sales Corporation, joined St. Regis in 1952.

John F. Gruber, vice president of St. Regis Sales Corporation and manager of the Southeastern district of the multiwall packaging division, will become district manager of the division's Eastern district, which has been expanded to include the present Southeastern district, effective May 15th.

William H. Versfelt, Jr., currently assistant to Mr. Gruber in the Southeastern area of the multiwall packaging division, is appointed assistant district manager of the southern area of the new Eastern district. Mr. Versfelt's headquarters will be in Baltimore, Md.

William T. Orr, assistant manager of the present Eastern district, has become assistant district manager of the northern area of the expanded Eastern district.

Carlton A. Denny, vice president of St. Regis Sales Corporation, has also become general assistant to **Reginald L. Vayo,** who is vice president of St. Regis Paper Company and general sales manager of the Kraft Division. Mr. Denny will assit Mr. Peterson in carrying out the overall policies pertaining to the sale of kraft pulp, paper and board. Mr. Denny has been with the Kraft division of St. Regis since 1920.

Thomas E. Button, vice president of St. Regis Sales Corporation, will be in charge of the sale of bleached and unbleached kraft board.

Joseph M. Listzwan will head the sale of both bleached and unbleach-kraft paper.

Arkell & Smiths, manufacturers of multiwall and specialty bags, have named Phil Rariden the new Louisville District Representative. He will operate out of the Company office at 4050 Reading Road, Cincinnati, Ohio, and will work under the direction of Tom L. Jones, Central Sales Manager.

A. B. Verdery, who has been appointed eastern district sales manager of Olin Mathieson Chemical Corporation's Eastern fertilizer division, John Nason, division general manager, announced. His headquarters will be in Baltimore. From 1950 to 1953 Mr. Verdery was president of his own company, the Augusta Fertilizer Company, Augusta, Ga.

Olin Mathieson Chemical has announced new duties for four of its executives as follows:

Gordon Grand has been named vice-president for administration, responsible for the personnel and industrial relations department, the public relations department, and the advertising and product publicity departments. Also included in his new duties are security matters and the operation of the company's Washington office.

W. J. Heckman has been named vice-president for purchasing and transportation, supervising purchasing, transportation and trade relations at the corporate level and he continues as director of purchasing.

R. E. McCormick has been appointed vice-president and secretary of the corporation. He will administer the legal affairs and legal personnel of the corporation, and remains as general counsel.

D. G. Ward has been appointed assistant vice-president for purchasing and transportation and director of transportation.

Union Bag and Paper Corporation has announced appointment of E. L. Corrent as multiwall bag sales representative for the Rocky Mountain States, headquartering in their Denver office. A member of the Union organization since 1931, he served most recently in the company's market research department, and prior to that was a multiwall bag sales representative in the Midwest.

Richard G. "Dick" Powell, whose appointment as technical service representative for Mississippi River Chemical has been announced by salesmanager John L. Sanders. Mr Powell will work with Bradley & Baker, distributors of MRC products.

J. L. Keena, who will represent agricultural chemicals division of Stauffer in the mid-West, it was announced by sales director Dan J. Keeting.

C. J. Watts, Jr., who has joined the agricultural chemicals sales department of Commercial Solvents Corporation, was announced by Clyde Marshall, general manager of the department.

Mr. Watts will handle the sale and distribution of CSC Ammonium Nitrate to the fertilizer trade in the southeastern states.

Dr. Charles H. Kline, manager of the newly-created chemical development division of Climax Molybdenum Company, announced by Reuel E. Warriner, vice president in charge of sales.

Thirteenth Annual Convention Association of Southern Feed and Fertilizer Officials

Jung Hotel—New Orleans, Louisiana

June 22 - 24, 1955

June 22

9:30 Invocation
Report of Secretary-Treasurer
Announcements and appointment of committees

9:50 President's address by E. A. Epps, Jr., Chief Chemist, Louisiana Department of Agriculture and Immigration, Baton Rouge.

10:10 Roll Call.

10:20 Welcome Address—Hon. Dave L. Pearce, Commissioner, Louisiana Department of Agriculture and Immigration, Baton Rouge.

10:30 Essential Relations between Control Officials and Agronomists—M. B. Sturgis, Head, Agronomy Department, Louisiana State University, Baton Rouge.

11:00 Fertilizer Grades—Frank E. Boyd, Virginia-Carolina Chemical Corporation, Richmond, Virginia.

11:30 Our Cooperative Efforts— E. C. Boudreau, Chief, New Orleans District, Food and Drug Administration, New Orleans.

12:00 Noon Recess

1:30 The Feed Law and Custom Mixing—Fred Brock, Chief, Texas Food Control Service, Texas Agricultural Experiment Station, College Station.

2:00 Building a Good Broiler Ration—A. B. Watts, Associate Professor of Poultry Husbandry, Louisiana State University, Baton Rouge.

2:30 Feed Control Problems Arising from Introduction of New Nutrients as Ingredients to the Feed Industry—J. R. Couch, Professor of Poultry Husbandry, Texas A & M College, College Station.

3:00 Urea for Ruminant Feed—Allen O. Tielman, Animal Husbandry, Oklahoma A & M College, Stillwater.

3:30 Industry's Stake in Regulatory Laws—W. F. Williamson, Louisiana Agricultural Supply Co., Baton Rouge

4:00 Adjourn.

6:30 Banquet—Speaker, C. H. Fisher, Chief, Southern Regional Research Laboratory, New Orleans, Louisiana

June 23

9:00 Feed Standards Committee

10:30 Fertilizer Committee

12:00 Adjourn
Afternoon Free.

June 24

9:00 Round Table for Control Officials

11:00 Report of Committees

12:00 Adjourn

Middle West Committee Offers 'Profitable Corn'

A new four-color folder entitled "You Can Grow Profitable Corn This Year" is now being distributed by the Middle West Soil Improvement Committee for sales promotion and educational use.

Member companies of MWSIC are using the folder in sales promotion work among their dealers and farmer customers and in contacts with educational outlets.

The committee is distributing copies of the folder to vocational agriculture teachers, county agents, extension worker, SCS personnel and other groups in the Corn Belt.

The eight-page folder uses pictures, graphs and charts to point up these factors in profitable corn production:

1—The role of high yields in cutting the cost of production per acre; 2—The amount of plant nutrients needed to get those high yields; 3—The rate at which nutrients must be made available during the summer; 4—The methods by which the nutrients can be applied.

In addition, the folder visualizes some of the common hunger signs that show on the leaves and ears of corn plants and stresses the need for efficient control of weeds, insects and diseases, if high yields are to be obtained.

Further information may be had from Middle West Soil Improvement Committee, 228 North La Salle St., Chicago 1, Ill.

The Frank G. Hough Co., 702 Seventh Street, Libertyville, Ill. will be glad to send you literature on this new Payloader, one of two completely new four-wheel-drive tractor shovels which they have had in process of development for more than five years . . . they get bigger loads easier, and carry bigger loads lower, operating with less spillage and greater stability.

Get Better Ammoniation
WITH NATURAL-TEXTURE
V-C Triple Superphosphate

Quality is the watchword at the big, new V-C Triple Superphosphate plant at Nichols, Florida. Here, V-C Triple Superphosphate is produced so that it retains its natural, desirable texture—a big help to you in simpler, faster ammoniation in your plant. This superior texture also helps you cut down on recycling at your mixing machines. V-C Natural-Texture Triple Superphosphate is backed by many years of experience and production know-how. V-C pioneered in the production of concentrated superphosphate as far back as 1907, when it put into operation, at Charleston, S. C., the first large-scale plant in the United States.

Depend on V-C to supply your Triple Superphosphate needs. Newly-expanded facilities and years of skill in production now combine to bring you Natural-Texture Triple Superphosphate designed to fit your production programs. Write or call *now!*

VIRGINIA-CAROLINA CHEMICAL CORPORATION

401 East Main Street, Richmond 8, Virginia

VC PRODUCTS ®

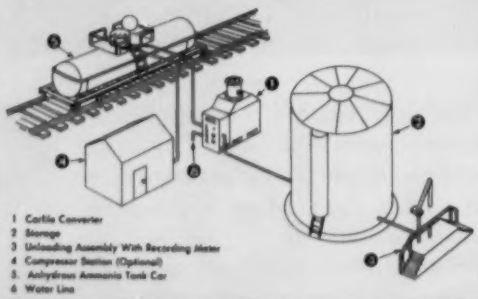
PRODUCE YOUR NITROGEN SOLUTION *FOR LESS*

a low cost
Carlile Converter
will put you in business
at once
for **Anhydrous Ammonia**

- **High Capacity**
- **Continuous Conversion**
- **Automatic (or manual) Operation**

CARLILE AQUEOUS AMMONIA PLANTS

Built around the Carlile Converter (above), these plants convert anhydrous ammonia direct from tank car to aqueous ammonia economically. A continuous operational plant. Produce any grade to suit...package built, installed, ready for operation.



NEW BULLETIN AVAILABLE
WRITE FOR DETAILS AND PRICE

COMPLETE LIQUID FERTILIZER PLANTS

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MFG. FACILITIES
ATLANTA-CHICAGO-LOS ANGELES-ST. LOUIS

J. C. CARLILE CORP. 425 Cooper Bldg., Denver 2, Colo.

10th Anniversary

June 7 marked completion of ten years service to the fertilizer industry by Southern Lead Burning Co.

Southern Lead Burning Co. has played a big part in building up-to-date new sulphuric acid plants and in modernizing older plants in the fertilizer industry, particularly in the South and Southeast.

SOUTHERN LEAD BURNING CO.
ATLANTA 2, GEORGIA
P. O. Box 4627 **Telephone: WAlnut 2576**

Alex. M. McIver & Son

BROKERS

Specializing
SULPHURIC ACID
Ground Cotton Bur Ash, 38/42% K_2O Potash.
Nitrogenous Materials
Castor Pomace
Urea, 45½% and 46% Nitrogen
Calcium Ammonium Nitrate, 20.5% Nitrogen

Representatives
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Bags—Paper and Textile
Ammoniated Base and Superphosphate
Dolomitic Lime
(42-44% Magnesium Carbonate)
(54/56% Calcium Carbonate)
POTASH

PEOPLES OFFICE BUILDING
Charleston South Carolina
Phones: 3-4828 and 3-4829

Anhydrous Releases Other Plant Foods

Scientific tests recently completed by the University of Missouri have determined that the application of nitrogen in the form of anhydrous ammonia makes available to growing crops substantial quantities of other valuable plant food elements.

This added advantage from the use of anhydrous ammonia has been suspected by farmers using this new form of gaseous nitrogen, but the exact extent of the release of other elements for plant use was not known until the Missouri tests were reported.

Measurements were made by Dr. George E. Smith of the Soils Department and Frank A. Stanley, a graduate student. They are reported in the article, "Proper Application Improves Value of NH_3," which is carried in the April-June issue of Agricultural Ammonia News.

Jack F. Criswell, executive vice president of the Agricultural Ammonia Institute which publishes the News, said, "The Nation's farmers will be deeply interested in the Missouri findings, because for the first time they now have an accurate basis for evaluating wholesome complementary advantages from the use of anhydrous ammonia."

The Missouri soil scientists made their tests in silt loam soil, which is comparable to that in many other farming regions.

In using 100 pounds of anhydrous ammonia per acre, they found that the synthetic nitrogen made available 47 pounds of additional phosphate and more than four pounds of additional potash. This phosphate and potash, although already in the soil, were in a form not yet available to growing plants.

Dr. Smith & Mr. Stanley also added proof to a thesis already accepted that ammonia upon application increases the pH in the soil. In some areas, farmers have the mistaken idea that ammonia increases soil acidity.

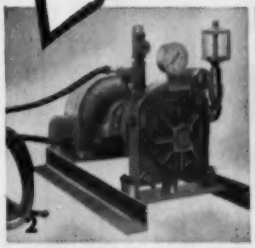
They also found that ammonia losses were extremely low when applications were made in soil at optimum 15-18 per cent moisture content. The loss was only 1 per cent in 36 hours, even though applied only 3 inches deep. They further concluded that dry soils hold ammonia far better than extremely wet soils.

The Agricultural Ammonia Institute, has plans for reproducing the findings of Dr. Smith and Mr. Stanley in a Technical Bulletin, available upon request to the Institute, Claridge Hotel, Memphis, Tenn.

HAVE YOU OVERLOOKED ANY OF THESE IDEAS?

There are places in your fertilizer plants where low-cost Johnson accessories can profitably increase the efficiency of your bulk-material storage, batching and blending operations . . .

1 **Pivoted Distributor** feeds materials to multiple-section bins. Turns, locks by ground-level control.

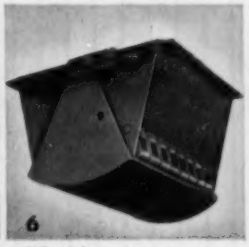


2 **Rotary Vane Compressor** supplies 7 cu. ft. air pressure per min. to aerate silos, bins. 15-lb. limit-relief valve.

3 **Aeration Fittings** properly spaced in storage bins and silos keep bulk materials fluid, free-flowing.

4 **Bin Gauges and Signals** accurately register "hi-lo-levels". Automatic. Water and dust-proof.

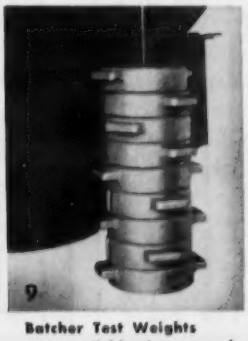
5 **Rotary Plug Valve** controls flow of finest materials. Plug works freely in self-aligning bearings.



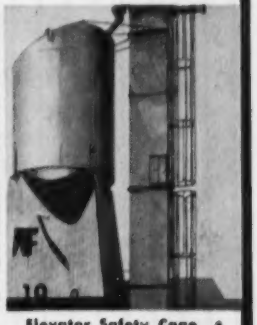
6 **Fill Valves** single-clam, radial-type, have choker weights on closing edge for jam-proof closing.

7 **Receiving Hoppers** all sizes, types for box-car, hopper-bottom car, truck, or bag delivery. Weather-tight.

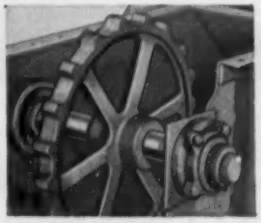
8 **Elevator Buckets** all-welded, light, smooth. • Two types, 7 sizes. Steel chain has carburized knuckles.



9 **Batcher Test Weights** are available in sets of nine, 50-lb. calibrated units, and two 25-lb. steel hangers.



10 **Elevator Safety Cage** • 28-in.-diameter ladder safety cage, welded to casing, costs only a few dollars per foot.



Chain Sprockets 19-tooth chilled-rim cast iron with heavy split hub; 12-tooth cast-chrome manganese.

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STREET _____

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J 347 "CF"

POTASH

The Quality Element

Muriate: 58-60% K_2O

Sulphate: 90-95% K_2SO_4

West German Orgin

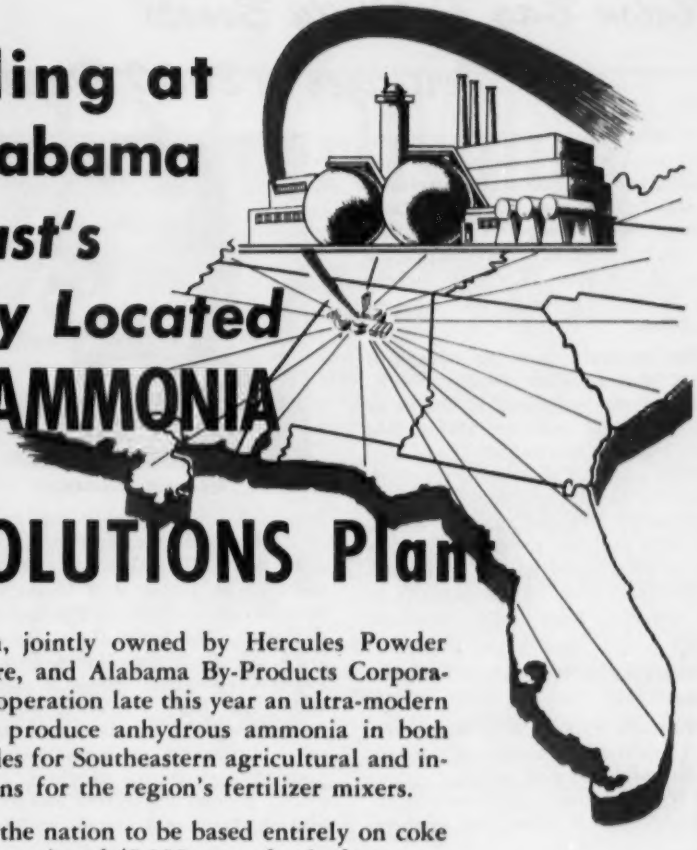
POTASH IMPORT & CHEMICAL CORPORATION

[illegible] MADISON AVENUE, NEW YORK 17, N. Y.

Now Building at Ketona, Alabama

Southeast's Most Centrally Located

ANHYDROUS AMMONIA and NITROGEN SOLUTIONS Plant



Ketona Chemical Corporation, jointly owned by Hercules Powder Company of Wilmington, Delaware, and Alabama By-Products Corporation of Birmingham, will place in operation late this year an ultra-modern new plant at Ketona, Alabama, to produce anhydrous ammonia in both commercial and refrigeration grades for Southeastern agricultural and industrial needs and nitrogen solutions for the region's fertilizer mixers.

The plant will be the first in the nation to be based entirely on coke oven gas. It will have an initial capacity of 45,000 tons of anhydrous ammonia, and nitrogen solutions in formulations preferred by fertilizer mixers in the Southeastern territory.

New Plant to Offer These Outstanding Advantages

Fast Deliveries — Lower Shipping Costs—Strategically located at a suburb of Birmingham, the geographic center of the fast growing Southeast, the plant will be able to save many users of its products time and money on delivery costs. This is an increasingly important factor in these highly competitive times.

Dependable Source of Supply—Coke oven gas, the plant's source material, will be drawn from the close-by Tarrant Coke facility of Alabama By-Products Corporation, the nation's second largest strictly commercial plant.

Responsible Ownership—Joint ownership and supervision by two of America's large, nationally-known companies and an experienced management and staff will assure maintenance of quality standards at all times.

- - - - - - - - -

For further information on how this centrally located Southeastern plant can serve you economically and efficiently, write Alabama By-Products Corporation, Sales Agents, P. O. Box 354, Birmingham, Ala.

KETONA CHEMICAL CORP.

KETONA, ALABAMA

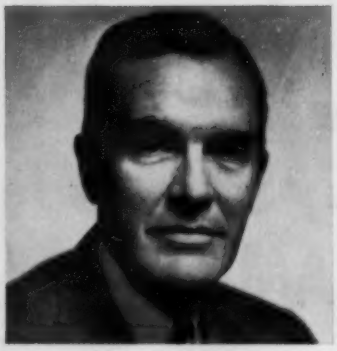
Union Bag Publicity Boosts Fertilizer in 2600 Papers

A campaign of publicity reaching 2600 weekly farm newspapers each month, each of which hits primarily at soil fertility and successful farm management through the use of fertilizer, has been in progress since the first of this year as a way to help the fertilizer industry sell more of its goods.

The program is being developed under the direction of Sydney K. Bradley, vice president in charge of multiwall bag sales for Union Bag and Paper Corporation. Says he: "Union planned this publicity campaign to supplement consumer promotions by fertilizer manufacturers. We hope that our program will create an even wider spread awareness at the farm level of the benefits to be derived from wise fertilizer usage."

Following is the text of a recent release:

"Farmers today are in a squeeze. Prices **paid** by farmers still outstrip prices **received.** Add acreage cuts—and it's plain that only increased efficiency can improve the picture.



Sydney K. Bradley

Lower costs—is the **only** answer.

"Best way to keep farm costs down is by more efficient production and there is no better way to do this than by proper use of fertilizer, according to the Agricultural Service Department of the **Union Bag & Paper Corporation,** maker of multiwall paper bags. Fertilizer, used at recommended rates, along with good seed, cultivating on time, a well-planned pest-control program, irrigation, prompt harvesting and other efficient farming practices will go a long way toward improving the situation.

"Actual tests in a midwestern state show that farmers could make $20 million more profit from 120 million bushels of corn—with recommended fertilizer practices—than on 140 million bushels with inadequate fertilizer. In a Southern state, it was found that farmers could make as much profit from 900,000 bales of cotton as from twice that number—using good practices and plenty of fertilizer.

"Fertilizer helps produce a much bigger yield per acre. And this increase in production enables farmers to use less acreage—thereby cutting production costs.

"Fertilizer is a big bargain today. Prices, in terms of plant food content, have advanced only 13% since 1935, while all items bought by farmers have advanced an average of 125% in the same period. Back in 1935 plant food content of a ton of fertilizer averaged 18.6%; today it averages 25%.

"Proper fertilizer is the only logical answer to the surplus problem now facing us. It is a simple way of cutting total farm production without cutting the farmers' net profit."

Now Available
in Ample Supply
WOODWARD
SULPHATE OF AMMONIA
Guaranteed 21% Nitrogen

Hot air-dried and free flowing, making it ideal for use in hopper type mixing equipment. Also excellent source of Nitrogen for direct application. Contains 24% Sulphur, an important ingredient in fertilizer. Shipped either in bulk or bagged.

Your inquiries invited.

WOODWARD IRON COMPANY
Woodward, Ala. Phone Bessemer 5-2491

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Founded 1903
FERTILIZER CHEMISTS
Three Convenient Laboratories
P. O. Box 1558 Atlanta, (1) Ga.
P. O. Box 789 Montgomery, Ala.
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Cut Production Costs—
Speed up your plant with
ATLANTA UTILITY
FERTILIZER MACHINERY
Fertilizer Mixing Systems
Revolving Screens
Mixing Plows
Clod Breakers
Elevators
Fertilizer Shakers
Cage Mills
Batch Mixers
Write Today for Descriptive Folder
ATLANTA UTILITY WORKS
EAST POINT, GA.

Wiley & Company, Inc.
Analytical and Consulting Chemists
Calvert & Read Streets
BALTIMORE 2, MD.

Classified Advertising

For Sale, Exchange and Wanted Advertisements, same type now used, EIGHT CENTS a word for one insertion; TWELVE CENTS a word for two insertions; FIFTEEN CENTS a word for three insertions, and FOUR CENTS a word for each insertion more than three; ADVERTISEMENTS FOR THIS COLUMN MUST BE PAID IN ADVANCE.

PLANT SUPERINTENDENT AVAILABLE, years of experience in acidulating and dry mix Plants as Superintendent. If you want a good man, write Box 15, Commercial Fertilizer, 75—3rd St., N. W. Atlanta, Ga.

SALESMAN WANTED: Excellent opportunity for experienced fertilizer salesman to represent an established company in North Central Midwestern area. State age, education, qualifications, experience and salary requirements; reply Box 22, c/o Commercial Fertilizer, 75 3rd St., N. W., Atlanta, Ga.

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